MARYLAND
NATURAL
HERITAGE
PROGRAM

MANAGEMENT PLANS FOR SIGNIFICANT PLANT AND WILDLIFE HABITAT AREAS OF MARYLAND'S EASTERN SHORE: WORCESTER COUNTY

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Sagittaria engelmanniana
Engelmann's Arrowhead

MANAGEMENT PROGRAMS FOR SIGNIFICANT PLANT AND WILDLIFE HABITAT AREAS IN WORCESTER COUNTY

FINAL REPORT

SUBMITTED TO:

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Tidewater Administration

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INTRODUCTION

In 1986 this project was initiated by the Coastal Resources Division of the Department of Natural Resources' Tidewater Administration. The task was designed to develop the information base and to determine the management mechanisms needed to implement an alternative approach to the State Critical Area Program for addressing the Geographic Areas of Particular Concern (GAPC) and Areas for Preservation and Restoration (APR) requirements of the Federal Coastal Zone Management Act. Under the GAPC requirements, coastal states are to inventory and develop management measures to protect the integrity of "areas of unique, scarce, fragile or vulnerable natural habitat" and "areas of high natural productivity or essential habitat for living resources, including fish, wildlife, and endangered species and the various trophic levels in the food web critical to their well-being." Under the APR requirement, coastal states are to include in their Coastal Zone Management Programs "provisions for procedures whereby specific areas may be designated for the purpose of preserving or restoring them for their conservation, recreational, ecological or aesthetic values."

To accomplish this task, a contract was awarded to the Maryland Natural Heritage Program, a division of the Forest, Park and Wildlife Service. The mission of the Natural Heritage Program is to identify and help preserve the biological and ecological diversity of Maryland. Since 1979, this program has been devoted to the collection of information about the State's rare, threatened, and endangered species and habitats. The program's extensive data base provided the basis for the identification of outstanding habitat examples on Maryland's Eastern Shore.

By January 1987, the Coastal Resources Division and the Maryland Natural Heritage Program established specific objectives to accomplish the project on Maryland's Eastern Shore, from Kent County south. These objectives were:

1. identify criteria for the selection of significant plant and wildlife habitat areas, and conduct a field inventory of selected areas;

2. undertake field inventory of areas identified in existing studies and data files of the Maryland Natural Heritage Program that are likely to be of habitat significance, in order to identify species and habitats associated with each site;

3. determine threats to each area and determine management mechanisms for protecting the integrity of such areas;

4. determine appropriate boundaries for each site including needed buffer areas; and

5. collect other locational information pertinent to the application of management mechanisms for a particular site.

These objectives combine to produce a protection package in which significant habitats (referred to as areas or sites) are assigned management mechanisms within a designated boundary. In accordance with the Natural Heritage Program's methodology, this area is then labeled a protection area.

Section 1 of this report provides a detailed description of the project methodology, scope of work, and the long-term framework established through the project. Section 2 provides Protection Area Summaries for significant habitat areas which have been identified. The Protection Area Summary contains information needed for site protection. A selection of applicable references follows Section 2. Appendix A contains a copy of the Department of Natural Resource's Regulations [COMAR .08.03.08] concerning the State's Threatened and Endangered Species.

SECTION 1

Procedures of Site Selection, Methods of Protection Implementation, and the Long-term Framework Established by this Project

INTRODUCTION:

This section provides all technical information on the project procedures from the planning stages, when habitat areas were selected for field checking, through the site visit, to the selection of the site for protection. Following this information, the report presents methods of implementing protection for selected sites. Finally, the long-term framework established by this project is discussed.

SITE IDENTIFICATION:

Significant plant and wildlife habitats were identified from the following categories of sites employing the methods described for each type.

1. Sites potentially inhabited by State Endangered or Threatened Species.

   Methods: Data concerning the habitat, phenology and taxonomy of each listed species were gathered from regional floristic surveys and scientific literature. Sites were located by using the habitat data in conjunction with National Wetland Inventory maps, aerial infrared photographs, and county soil surveys. These sites were surveyed when the species could be identified accurately according to the taxonomic and phenological data.

2. Sites with historical occurrences (reported prior to 1980) of species determined to be rare by the Natural Heritage Program and found in their publication, Threatened and Endangered Plants and Animals of Maryland (Norden et al., 1984).

   Methods: For each species, data were gathered concerning habitat, phenology and taxonomy. Many of the historical records provided only general locations for rare species. For these records, more specific locations for survey were selected

based upon habitat data supplemented by National Wetland Inventory maps, aerial infrared photographs, and county soil surveys. The field staff surveyed sites when the species could be accurately identified according to phenological and taxonomic information.

3. Non-tidal wetlands.

Methods: National Wetland Inventory maps and aerial infrared photographs were used to locate non-tidal wetlands. Particular attention was given to wetlands in State Parks, Forests and Wildlife Management Areas. Based upon the findings of "The Functional Assessment of Non-tidal Wetlands," a report completed for the Coastal Resources Division by the Maryland Natural Heritage Program (Bartgis 1986), these wetlands were assigned priorities for survey. High and intermediate priority wetlands listed below were candidates for intensive survey.

a. Non-tidal Wetland Complex, i.e., two or more contiguous wetland communities with one of the following traits:

   i. For complexes under 10 acres, presence of at least 2 wetland communities;

   ii. For 10- to 100-acre complexes, presence of at least 4 wetland communities; or

   iii. For complexes greater than 100 acres, presence of at least 6 communities.

b. Seasonal Ponds: wetlands occurring mainly on Pocomoke soils in centripetally-drained, seasonally flooded basins dominated by Walter's Sedge (Carex walteriana) or Twigrush (Cladium mariscoides).

c. Bogs: highly acidic wetlands characterized by highly organic soils and/or Sphagnum.

d. Palustrine Forested Deciduous Wetlands (PFO1) with at least one of the following characteristics:

   i. Seeps

   ii. Vernal pools

iii. Well-developed stratification

e. Palustrine Forested Evergreen Wetlands (PFO4) dominated by Bald Cypress (Taxodium distichum), or Atlantic White Cedar (Chamaecyparis thyoides).

FIELD INVENTORY:

Observations and data were collected in the field concerning the general character of each site, the degree of unnatural disturbance and, if present, the condition of the rare species populations. Prior to surveying sites on private land, permission was obtained from landowners.

First, the natural features of each site were described, noting the dominant vegetation, aquatic features, physical relief and natural disturbances (such as insect defoliation or trees felled by high winds). A list of the common plant species was developed and unique communities were identified and mapped.

When the rare species were found, the size and extent of their populations were estimated. Staff members also estimated the proportion of the population that was flowering and fruiting, and marked the population on the general map of the site. The microhabitats of the rare species were described. If a population was large, voucher specimens of the rare species were collected and deposited with the Natural Heritage Program. Small populations of rare species were photographed for verification. If rare species were absent from historical locations, the habitat was assessed to determine if it could still support the species or if the habitat had been altered such that the species could no longer survive.

Finally, the habitat integrity of each site was assessed. Staff members recorded unnatural disturbances and their current and potential future effects on the habitat. For example, the presence of ditches in non-tidal wetlands was reported, and the effects of the ditches on wetland hydrology and vegetation were reviewed. Threats to the integrity of the habitat were discussed. Current and potential future uses of surrounding land were considered. In light of these threats, staff members recommended management activities intended to maintain the habitat and sustain the populations of rare species.

STRATEGY FOR SELECTING SIGNIFICANT SITES:

The selection of ecologically significant sites for protection was based on a number of criteria which were assessed during the field inventory. These criteria are as follows:

1. Site contains species which are considered by the Maryland Natural Heritage Program as Rare, Threatened or Endangered in Maryland (see Norden, et al, 1984). Many of these species are listed in the revised Department of Natural Resource's Regulations under COMAR .08.03.08.

2. Site contains one or more rare or ecologically unique natural communities.

3. Overall ecologic integrity of the site is high. Unnatural disturbances must be minimal or must be such that their effects simulate natural forces of disturbance. The presence of recent disturbances which will change the current character of the site by diminishing its natural ecologic balance may be reason to exclude a site from selection.

4. Human-induced threats which could lead to the loss of the rare species or habitat(s) must be minimal.

5. Regulation and monitoring must be feasible so that actions (both on-site and nearby) can be limited to those that do not negatively impact the rare species and natural habitat(s). Required buffer zones must be available to ensure site protection.

6. Anticipated future land-use must not conflict with protection of the habitat.

7. Ecologic, scenic, or historic values other than those related to rare species and habitat protection may be present.

SITE PROTECTION IMPLEMENTATION METHODS:

This section will be used in 1988 for the implementation of site protection. Protection may be implemented in a variety of ways depending upon ecological significance of the site, type of ownership (public vs. private), seriousness of threats, degree of management required, and landowner preference. The various options available confer varying degrees of protection security and of landowner control. They range from designations which afford no legal protection to acquisition by a conservation organization. The following list describes the available options and the degree of protection which they provide. Because the significance and consequences of each mechanism varies, some sites may receive simultaneous protection from more than one type.

Natural area protection may be accomplished by a number of types of organizations. Federal, State, and local governments (at the County as well as the municipal levels) have specific tools and mechanisms by which they may set aside or regulate land for conservation purposes. In addition, there are private organizations which can either protect lands on their own or facilitate the efforts of the public sector. Many of the protection mechanisms listed below may be implemented by any of the aforementioned conservation organizations, while others may only be available to certain agencies or organizations.

The following methods afford protection to rare species habitat by outlining and assigning management responsibilities to a particular party:

1. Voluntary management agreement - landowner informally agrees to protect the rare species and habitat by not disturbing the site.

2. Registration - landowner signs a written, nonbinding agreement with the State's Department of Natural Resources, a county government, The Nature Conservancy, or another private conservation organization, officially recognizing the ecological significance of the site. Management needs are outlined, and the landowner agrees to perform specified tasks to promote rare species and habitat.

3. Legally binding protection agreement - landowner enters a legally binding management agreement or leases the land to a conservation organization for management purposes. Conservation easements granted by the Maryland Environmental Trust, local government, and other private trusts (including The Nature Conservancy) impose certain land-use restrictions while conferring tax benefits to the landowner.

4. Zoning - the site may be zoned or rezoned as a conservation area in which land-use is restricted. Development may be highly regulated or prohibited. Such protection is usually accomplished on a county level through local ordinances.

5. Bequest or Right of First Refusal - landowner agrees to will land or give right of first refusal for acquisition to a State, county, or private conservation organization at some undetermined time in the future.

6. Acquisition - landowner conveys property to a conservation organization. The transfer may be a donation, a bargain sale (i.e, below market value) or a fee simple (i.e, full market value) transaction. The first two types of transaction confer tax benefits to the landowner. All rights to the land belong to the buyer, and management is directed toward the protection of rare species and habitat(s). In some cases, acquisition may occur with the retention of a life estate for the owner. This allows the landowner to continue to live on and have restricted use of his property until his death, at which time the buyer obtains full control.

The following methods are designations which afford no current protection but which serve to acknowledge the ecological significance of a site and which may be used to stimulate further protection efforts:

1. National Registry of Natural Landmarks - land which is determined to be a nationally significant example of the Nation's natural heritage may be designated a National Natural Landmark by the Secretary of the Interior.

2. Sensitive Management Areas - land within the State Park System which is considered in need of special protection because of its unique and fragile physiography, flora and fauna may be designated a "Sensitive Management Area" and is reserved for only those activities compatible with preservation.

3. Maryland Wildlands Preservation System - land which has retained its wilderness character or which has rare species or similar features of interest worthy of preservation for use of present and future residents of the State may be termed "wildland."

4. Natural Heritage Area - land which meets all three of the criteria listed in the revised Regulations under COMAR .08.03.03 Threatened and Endangered Species may be designated a Natural Heritage Area subject to the approval of the Secretary of Natural Resources.

Information provided in the Protection Area Summaries of this report is used to assess the degree of protection needed.

LONG-TERM FRAMEWORK:

This project provides a foundation for tasks to begin in 1988. These tasks, described below, involve the further identification and protection of significant habitats within the coastal zone.

Next year, the methodology developed in this project will be utilized to continue the identification of significant plant and wildlife habitats in coastal counties west of the Chesapeake Bay. Protection Area Summaries identical in format to those used in 1987 will be completed for significant sites. Three counties, Baltimore, Harford, and Prince Georges have hired personnel (with the assistance of the Coastal Resources Division) to help complete this task in their counties.

Additionally, 1988 will mark the beginning of site protection implementation. Those areas identified in 1987 are now candidates for protection, and efforts will begin to insure that each site is protected. The effort required to afford protection to each site is great, and this task should continue into the 1990's. Significant areas identified in 1988 will also become candidates. It is important to note that many additional sites will be identified on Maryland's Eastern Shore, and these areas can and will be protected within the framework of this project.

SECTION 2

Protection Area Summaries

INTRODUCTION:

The remainder of this report contains site-specific protection information for all selected areas. Each of these areas is reviewed in a Protection Area Summary (PAS) that describes the protection area, its values, and its protection needs. The PAS is composed of several parts, each of which will be discussed below. Format and content are best understood with the insight provided in this section.

Protection Area Name - An identifying name has been assigned to each protection area. This is usually based on the site's location and/or habitat type.

County - The county in which the protection area is located is given.

USGS Quad(s) - Identifies the United States Geological Survey topographic map(s) on which the protection area occurs.

SUMMARY OF ECOLOGICAL SIGNIFICANCE - the major reasons for protecting the site are summarized. This section, along with the following element summary table, describes the key ecologic significance of the protection area.

Both the rare species and habitat are considered significant. For some of the protection areas the habitat is described in this section. In others, rare plants or animals may be listed and their status with the State is given. In some cases, only the most endangered species are mentioned here, leaving the others to be mentioned in the element summary table.

ELEMENT SUMMARY TABLE - Each of the rare species currently known to occur at the site is listed. The scientific name is given along with the common name. In some cases, no common name was assigned to the species; therefore, only the scientific name is used.

The Maryland Natural Heritage Program has assigned all the rare species a rank based on their status nationally, within the region, or within the State. In addition, many of these species have been listed in the revised Department of Natural Resource's Regulations .01 - .11 under COMAR .08.03.08 Threatened and

Endangered Species. The Status column of the Element Summary Table gives the listing category for these species as designated in the Regulations. Three possible categories were designated:

Endangered - any species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy including any species determined to be an "Endangered Species" pursuant to the U.S. Endangered Species Act of 1973, 16 U.S.C. 1531-1543.

Threatened - any species of flora or fauna that appears likely, within the foreseeable future, to become endangered including any species determined to be a "Threatened Species" pursuant to the U.S. Endangered Species Act of 1973, 16 U.S.C. 1531-1543.

In Need of Conservation - any wildlife species determined by the Secretary of Natural Resources to be in need of conservation measures for its continued ability to sustain itself successfully.

For those species that were not listed in COMAR .08.03.08, the Natural Heritage Program rank is given. The following terms are used:

Regionally Rare - in danger of extinction in Maryland and rare throughout all or most areas of surrounding states.

Highly State Rare - in immediate danger of extinction in Maryland.

State Rare - in danger of extinction in Maryland.

Watchlist - believed secure in Maryland but populations are uncommon, local or seriously declining.

Note that species listed in the Regulations are not necessarily rarer than those species that are not listed but are ranked by the Natural Heritage Program. These unlisted species, many of which are quite rare, are currently under consideration for listing in the Department's Threatened and Endangered Species Regulations.

OTHER SIGNIFICANCE AND VALUES - This section describes other important aspects of the protection area. Often the habitat is the focus because the habitat in which most rare species are found is also rare.

The value of the protection area to wildlife and for ecosystem maintenance may also be discussed. In setting aside

rare species habitat (which includes additional buffer land), a safe haven is provided for wildlife and for the perpetuation of naturally functioning ecosystem processes.

Many of the proposed protection areas are adjacent to or part of designated management areas. They may overlap with or abut upon State Forests or Parks, State Scenic Rivers, Natural Heritage Areas or Nature Conservancy protection areas. By increasing the size and/or protection of these areas, their ecologic and scenic values may be enhanced.

THREATS AND MANAGEMENT NEEDS - Both potential and current threats to the rare species or to the natural habitat are described. These are generally related to human-induced habitat alterations, such as forest cutting, hydrologic alteration, vehicular traffic, or powerline maintenance practices. In some cases, however, there are natural threats such as insect infestation or natural succession.

Specific management recommendations are then given. Voluntary management agreements are often suggested. In some cases, monitoring of rare species populations is recommended. Such studies are needed in order to learn more about the demographics and ecological requirements of the rare plants and to provide warnings of serious population declines.

BOUNDARY RECOMMENDATIONS - The proposed protection area is delineated by a line termed the protection area boundary. The habitats to be included within this boundary are described and the reasons for their inclusion are given. Within this boundary the threats listed in the previous section should be avoided to protect the significant habitat and rare species.

Within the protection area boundary, a buffer has been placed around the core rare species habitat. This zone consists of adjacent land needed to protect the critical habitat from the impacts of land use in surrounding areas. When the critical habitat is a wetland, lands which drain into it may be included as buffer. Surrounding forest may be designated for many reasons. These include maintaining canopy cover to prevent the invasion of weedy or exotic species, stabilizing soils to prevent sedimentation of waterways, filtering out chemicals or excess nutrients, and maintaining hydrology.

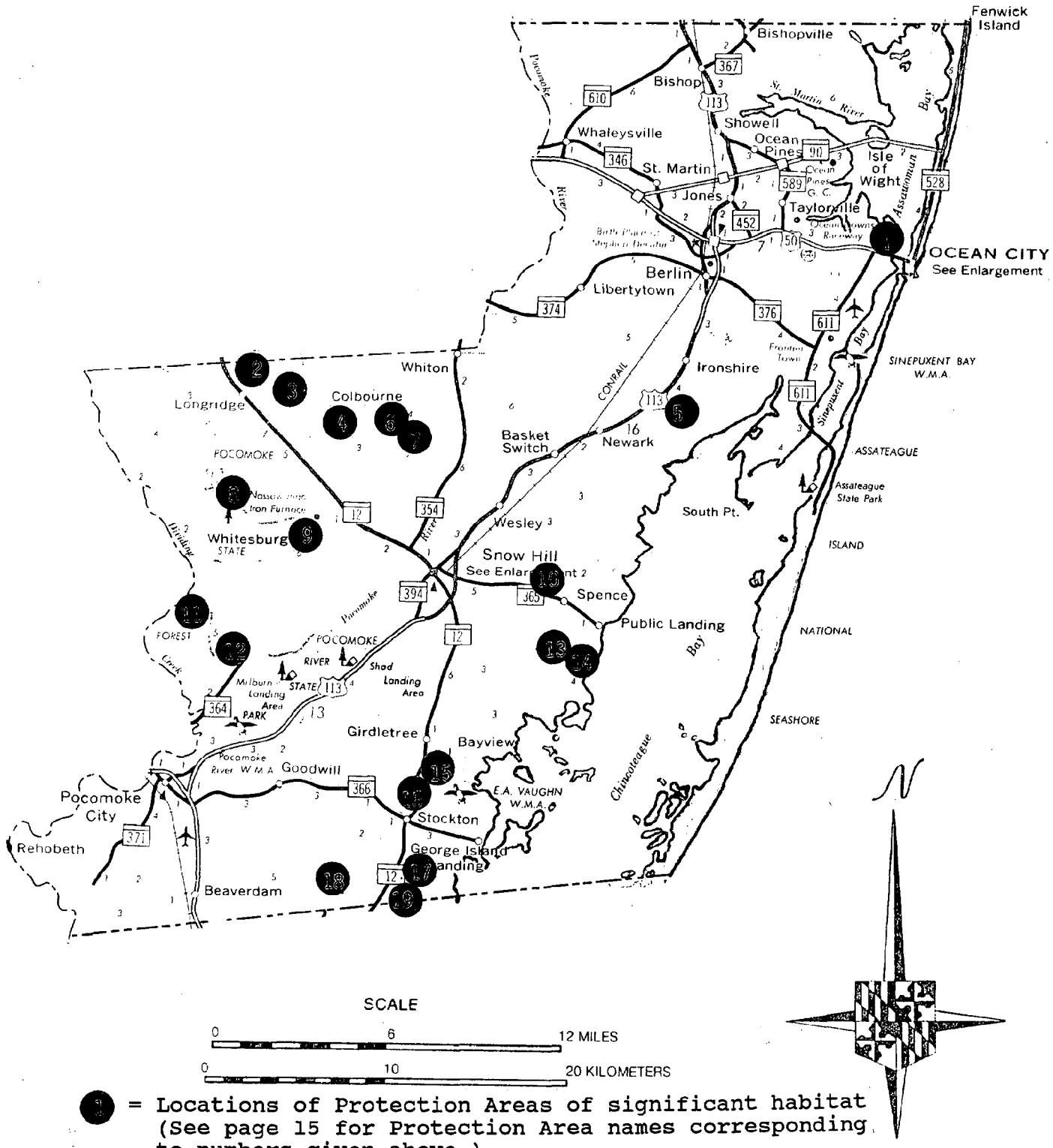
The delineation of buffers varies depending on the habitat, surrounding land use, protection of the species and its habitat, local hydrology, and possible future threats. Reasonable and effective buffers were determined after careful consideration of these factors.

Maps and additional information concerning boundary locations are available from the Natural Heritage Program.

SITE DESCRIPTION SUMMARY - Finally, a general description of the protection area is given. Each of the natural communities is discussed and its relationship to surrounding communities is described. In addition, the hydrologic regime of the community and the range of seasonal variability of water table depth are provided. Dominant trees, shrubs, and herbaceous plants are listed.

Note: Common names for species are used throughout the Protection Area Design Summary except when no common name is available. When a specific species is named, the common name is capitalized.

WORCESTER COUNTY



● = Locations of Protection Areas of significant habitat (See page 15 for Protection Area names corresponding to numbers given above.)

WORCESTER COUNTY: Protection Area Locations

Protection Area	Site # on County Map
Campground Branch	10
Colbourne Powerline	4
Dividing Creek Ponds	11
E.A. Vaughn WMA Woodland	15
Forest Lane	7
Furnace	9
Furnace Road Powerline.	8
Hancock Creek	17
Little Mill Run	18
Mt. Olive Church Road	6
Oak Hall Road Powerline	12
Pawpaw Creek	13
Pikes Creek	16
Porter Neck	5
Powell Creek	19
Spearin Road Powerline	2
Sturges Creek Powerline	3
Tanhouse Creek	14
West Ocean City Pond	1

PROTECTION AREA SUMMARY

Protection Area Name: Campground Branch

County: Worcester USGS Quad: Public Landing

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This bottomland hardwood forest contains three plant species that are rare in Maryland, including two State Endangered Species, Joor's Sedge (Carex joorii) and Short-bristled Hornedrush (Rhynchospora corniculata). Each of these two species is known from fewer than ten sites in Maryland, and none of these sites is protected. In addition, Overcup Oak (Quercus lyrata), a Watch List Species, is a common species in this protection area.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Carex joorii	Joor's Sedge	Endangered
Rhynchospora corniculata	Short-bristled Hornedrush	Endangered
Quercus lyrata	Overcup Oak	Watch List

OTHER VALUES AND SIGNIFICANCE:

This swamp forest is an excellent example of the now uncommon mature bottomland hardwood forest. Many of the Red Maples and oaks are quite large. Because such trees are usually harvested before they reach this size, old growth forest communities are becoming increasingly difficult to find in Maryland. Old growth provides habitat for specialized birds and insects which require dead or aging trees for food and shelter.

Because the forest is old and the only disturbance has been natural blowdown, the trees are well spaced. The canopy is broken in a number of places bringing in light, which, along with a fairly open understory, makes it an unusual habitat.

THREATS AND MANAGEMENT NEEDS:

Threats

The major threat to this protection area is forest cutting. The trees are large, and because many of them are oaks they would provide valuable timber. Any logging activity would destroy the

high quality of this mature forest. Non-native, weedy species invade the disturbed canopy openings often to the exclusion of native plants. In addition, logging practices often alter local hydrology, which alters the species composition of the wetland.

A second threat comes from nearby agricultural lands. Fertilizers, farm chemicals, and weedy, non-native plants that invade cultivated fields must be prevented from impinging upon the swamp forest. Such pollutants and plant invaders could endanger the health of the more fragile species.

Management Needs

Forest cutting and hydrologic alteration should be prohibited within the protection area boundary. Plans for ditching or drainage of land surrounding the protection area should be reviewed for potential effects on the rare species' populations.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes the floodplain south of Scotland Road and downstream to Double Bridges Road. This is the portion of the creek which contains old growth forest and the rare sedges. A forested zone on either side of the floodplain is included as buffer and as habitat for forest interior dwelling wildlife. It extends to the crest of the surrounding upland. The creek's headwaters and tributaries are also protected by a forested buffer, ensuring high water quality downstream.

SITE DESCRIPTION SUMMARY:

This 230 acre protection area encompasses the floodplain of Campground Branch near its headwaters. At its origins, the creek flows in a southerly direction, but it soon turns and flows northward. It passes through two culverts under Scotland Road. The bottomland is about 300 ft. wide and lies 10 ft. below the surrounding upland. The swamp forest is dominated by mature hardwoods, including Overcup Oak, Basket Oak and Red Maple. The trees are large and well spaced, creating an open forest. Understory vegetation consists of fetterbush and blueberry shrubs, several species of fern (which are quite dense in some places), and patches of grasses and sedges. The two State Endangered Species of sedges are located in forest openings created by natural tree blowdowns.

Prepared by: Abigail Rome

Date: August 1987

PROTECTION AREA SUMMARY

Protection Area Name: Colbourne Powerline

County: Worcester USGS Quad: Wango

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Colbourne Powerline right-of-way supports three plant species which are rare in Maryland, including two State Endangered Species. Rhynchosia tomentosa is found at a total of four sites and the combined total of these populations numbers fewer than 60 plants. Awned Mountain-mint (Pycnanthemum setosum) was, until this year, thought to have been extirpated from Maryland. It was recently rediscovered at four other sites. A third plant, Pink Milkwort (Polygala incarnata), is a Watch List Species.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Pycnanthemum setosum	Awned Mountain-mint	Endangered
Rhynchosia tomentosa		Endangered
Polygala incarnata	Pink Milkwort	Watch List

OTHER VALUES AND SIGNIFICANCE:

Powerline right-of-ways have become significant habitat for a large number of threatened and endangered plant species. Powerline maintenance practices sustain an open canopy. Historically, the major sources of natural forest canopy removal were forest fire and beaver activity. However, natural forest openings are now uncommon due to modern fire suppression practices, and the beaver populations on the Eastern Shore have been decimated.

THREATS AND MANAGEMENT NEEDS:

Threats

If current management practices remain in place, then serious threats to this area are not anticipated. Minor threats include the invasion of non-native weed species and damage to plants by vehicle traffic.

Management Needs

Current powerline maintenance practices appear to favor the rare plants. However, more information on the effects of powerline maintenance on rare plant populations is needed. Future studies may offer more specific recommendations.

One precaution which should be taken now and which should be included in a management agreement with the utility company concerns heavy vehicle traffic. The use of trucks or motorized vehicles should be reduced within the area inhabited by rare species.

BOUNDARY RECOMMENDATIONS:

The protection area boundary incorporates the powerline right-of-way from The Nature Conservancy's Nassawango Creek Protection Area boundary line (about 500 ft. east of the creek) east to Mt. Olive Church Road. This area includes plant habitat for the three rare species seen here. It also includes forested buffer on either side of the powerline opening. By maintaining the forest cover adjacent to the right-of-way, the plants will be insulated from changes in surrounding land-use.

SITE DESCRIPTION SUMMARY:

Colbourne Powerline Protection Area encompasses 85 acres in a Delmarva Power and Light Company right-of-way which is oriented in a northwest-southeast direction across Nassawango Creek. It consists of mostly dry uplands with a sandy substrate. Dominant vegetation is a mixture of legumes, Joe-pye-weeds, sunflowers, grasses and hair-cap moss, as well as small trees and shrubs. The latter include Red Maple, several oak species, blueberry, Sweet Gum, and hollies, which are kept under control by herbicide application. In one area, the topography dips slightly and a dense cat-tail and sedge dominated swale occurs. Several narrow, shallow ditches also traverse the upland area of the right-of-way, producing localized, wetter conditions.

The surrounding forest is generally mixed pines and hardwoods, with occasional areas dominated by pine. Dirt roads cross the powerline in at least two spots, while forest trails, some of which are used by hunters, lead to and from the right-of-way.

Prepared by: Abigail Rome

Date: July 1987

PROTECTION AREA SUMMARY

Protection Area Name: Dividing Creek Ponds

County: Worcester USGS Quad: Dividing Creek

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Dividing Creek Ponds Protection Area contains two seasonal ponds. Seasonal ponds are now the only natural, herbaceous, non-riverine, freshwater wetlands left on the coastal plain. Because they are hydrologically connected to the groundwater, water levels vary both seasonally and annually, causing fluctuations in plant species and cover. Once quite abundant on the Delmarva peninsula, many similar ponds have been drained for agricultural purposes.

Dividing Creek Pond is an unusually large seasonal pond, about 3 acres in area. Late in the growing season when the pond has dried, six rare herbaceous plants can be seen. Four of these, Six-stamened Cutgrass (Leersia hexandra), Thread-leaved Beakrush (Rhynchospora filifolia), Canby's Lobelia (Lobelia canbyi), and Pink Bog-button (Sclerolepis uniflora) are State Endangered, and in the case of the first two species, these are the only known populations in Maryland. Two other plants, Clustered Bluets (Oldenlandia uniflora) and Reticulated Nutrush (Scleria reticularis), considered Highly State Rare, are also found here.

A second smaller pond, Dividing Creek Ditch Pond, is located to the north of the first and also contains Canby's Lobelia. Further survey may produce evidence of other rare species.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Rank
Leersia hexandra	Six-stamened Cutgrass	Endangered
Lobelia canbyi	Canby's Lobelia	Endangered
Rhynchospora filifolia	Thread-leaved Beakrush	Endangered
Sclerolepis uniflora	Pink Bog-button	Endangered
Oldenlandia uniflora	Clustered Bluets	Highly State Rare
Scleria reticularis	Reticulated Nutrush	Highly State Rare

OTHER VALUES AND SIGNIFICANCE:

The forested wetlands surrounded by mature pine forest provide essential habitat for forest interior breeding birds. Old growth conditions are rare in Maryland and have a multitude of values for wildlife.

The presence of two hydrologically different seasonal ponds, in close proximity, which harbor similar rare plants, makes this protection area a good site for monitoring and ecological research of rare species.

THREATS AND MANAGEMENT NEEDS:

Threats

At the northern edge of the larger pond is an old slightly overgrown ditch, evidently excavated in order to drain the pond so that pines could be planted for forestry purposes. The ditch runs about 300 yds. and ends where a slight downhill slope allows natural runoff. The presence of water in the ditch in late April indicates that the ditch continues to drain the pond. Continued outflow of water could cause the pond to dry to the extent that woody species could invade and outcompete the rare plants.

Cutting of the surrounding second growth mature forest would threaten the ponds' flora by increasing ambient light. This would promote the establishment of non-native, weedy species. Rutting and ditching brought about by heavy equipment used in timber operations could also affect the local hydrology, causing the ponds to dry more quickly and allow woody species to establish.

Management Needs

A management agreement with State Forest personnel should be promulgated to ensure that any activities which affect the forest cover and hydrologic regime are avoided.

Because the populations of rare plants are small, monitoring is recommended. Optimal growing conditions could then be determined and further management could be directed towards providing increased habitat to stabilize populations.

BOUNDARY RECOMMENDATIONS:

The protection area boundary is drawn to include both ponds and a buffer around them. This buffer extends to the crest of the uplands in the State Forest. It protects the majority of the forested land which drains into the ponds and so ensures high water quality from local runoff. The protection of both the open deciduous forest in the pond as well as the denser pine forest on

the uplands also provides a diversity of forested habitats for wildlife species.

SITE DESCRIPTION SUMMARY:

This 150 acre protection area is designated to conserve two slightly different seasonal ponds. Dividing Creek Pond is a 3-acre non-tidal wetland which has up to four ft. of water in the winter but which often dries completely by the end of the growing season. For most of the year, the dominant vegetation is broad-leaved deciduous trees - Red Maple, Sweet Gum, and Blackgum. The majority of herbaceous plants appear only late in the season after drawdown. Dominant plants include Carex sedges, bullrushes, grasses, and young Buttonbush. The surrounding upland is pine forest containing wetland hardwoods such as Water Oak, Sweet Gum and Sweetbay Magnolia. There is an understory of shrubs but little herbaceous cover.

Dividing Creek Ditch Pond is less than one acre in size and is located to the north. From the dirt road which runs between the two ponds it appears as a ditch (a result of man-made interferences) but it widens out to the north. It is lined with shrubs, some of which extend into the middle of the pond. Grasses, sedges and other emergent vegetation are conspicuous after the pond dries, usually in summer. Surrounding vegetation in the upland consists of a 15 - 20 year old Loblolly Pine forest.

Prepared by: Abigail Rome

Date: May 1987

PROTECTION AREA SUMMARY

Protection Area Name: E. A. Vaughn WMA Woodland

County: Worcester USGS Quad: Girdletree

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The E. A. Vaughn WMA Woodland Protection Area contains a large, mature, deciduous forest and swamp with one of five large stable populations of Dwarf Trillium (Trillium pusillum) known in Maryland. This species of Trillium is Threatened in Maryland, is known from fewer than 50 sites worldwide, and is under consideration by the U.S. Fish and Wildlife Service as a Federally Endangered Species.

Like other areas with Dwarf Trillium, the forest supports many species which are otherwise very uncommon on the lower Delmarva peninsula.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Trillium pusillum	Dwarf Trillium	Threatened

OTHER VALUES AND SIGNIFICANCE:

The upland, old growth forest and adjacent bottomland hardwood forest provide diverse habitats for forest interior dwelling birds, reptiles, and amphibians.

THREATS AND MANAGEMENT NEEDS:

Threats

Logging within the protection area boundary is the biggest threat to the Trillium at this site. If logging occurs upstream, hydrological disturbance to the stream could be detrimental. Logging the upland buffer will allow weed species to threaten the Trillium. Logging within the population boundary will physically destroy Trillium plants.

Management Needs

If logging is avoided, no special management is needed to protect the site. The size and reproductive success of the Trillium population should be monitored.

BOUNDARY RECOMMENDATIONS:

The protection area boundary contains the entire population of Dwarf Trillium, the upstream forested areas, and the adjacent uplands as buffer. Within this boundary, active disturbances and the threats mentioned above should be avoided.

SITE DESCRIPTION SUMMARY:

This 65 acre area is along the east side of Rte. 12, along the south fork of Scarboro Creek. Thousands of Dwarf Trillium are found within 100 yds. of the road and extend downstream 500 yds., always within 50 yds. of the forested bottomland. Old growth forest is adjacent to the forested bottomland, but has been clearcut in one section north of the stream 500 yds. from Rte. 12. Tulip Tree is abundant near the stream and less common on the upland, where oaks and Loblolly Pine are more common. Vernal pools occur in some sections of the upland forest.

Prepared by: J. Christopher Ludwig

Date: November 1987

PROTECTION AREA SUMMARY

Protection Area Name: Forest Lane

County: Worcester USGS Quad: Snow Hill

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This protection area contains two plants and an animal considered rare in Maryland. Aster-like Boltonia (Boltonia asteroides) is a State Endangered Species known from just three other sites in Maryland. The number of plants here nearly equals the number at the other three sites combined. Clustered Bluets (Oldenlandia uniflora), considered State Rare, is also found here. Carpenter Frog (Rana virgatipes), a Species In Need Of Conservation, also inhabits this protection area.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Boltonia asteroides	Aster-like Boltonia	Endangered
Rana virgatipes	Carpenter Frog	In Need of Conservation
Oldenlandia uniflora	Clustered Bluets	State Rare

THREATS AND MANAGEMENT NEEDS:

Threats

The location of these plants in and adjacent to drainage ditches along a road poses serious threats to their viability. In the case of the Boltonia, continued roadside mowing will inhibit reproduction and prevent population growth. Because these plants grow along the edges of the ditches, they are also susceptible to being buried under spoil when the ditches are redredged. The Clustered Bluets are found in one of the ditches and, in addition to excessive mechanical disturbance, they are threatened by the agricultural runoff which inundates them each spring. Herbicides, pesticides and fertilizers drain directly from the fields into a culvert which empties onto the plants.

Management Needs

As long as agricultural runoff is directed into the culvert which supports these rare plants, excessive use of herbicides, pesticides, and fertilizers should be avoided.

Management agreements with county roadside maintenance crews must be implemented in order to ensure the continued survival of the Boltonia population. Mowing should be conducted only early in the season before the plants appear or late in the year when reproduction has finished. Redigging of ditches should be avoided in the rare plant habitat.

BOUNDARY RECOMMENDATIONS:

The protection area is comprised of the rare plant habitat and a buffer to the north. This buffer consists of agricultural fields which drain into the rare plant habitat. It should be managed to protect the rare plants. To the south and west, the protection area includes a wetland forest which is hydrologically associated with the open roadside community, and which serves as rare animal habitat.

SITE DESCRIPTION SUMMARY:

This 27 acre protection area encompasses a roadside swamp forest dominated by Red Maple and Sweet Gum in the canopy and sedges and sphagnum moss in the understory. It is here that the Carpenter Frog makes its home. A small electric utility line runs through the center of the protection area, at an angle of about 45^0 to the road, and is maintained as a powerline right-of-way. The rare plant species occur about 10 ft. from the road, in and adjacent to a drainage ditch which receives water through a culvert. The flow originates in a soybean field on the other side of the road. The site is dominated by roadside weeds such as Common Tickseed Sunflower, Large-flowered Partridge Pea, Ragweed, grasses, and rushes. Shrub and tree growth are inhibited by roadside mowing on one side and utility line maintenance on the other.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: Abigail Rome

Date: September 1987

PROTECTION AREA SUMMARY

Protection Area Name: Furnace

County: Worcester USGS Quad: Snow Hill

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Furnace Protection Area contains one of Maryland's best examples of a relatively undisturbed dry forest over Lakeland soils. These soils are one of the sandiest on the Delmarva peninsula, providing habitat suitable only to certain specialized plants. Shrub cover is naturally low, and tree growth is slow due to the sterility and low water holding capacity of the soil. Many of the rare herbaceous plants are found in disturbed areas. These rare species are uniquely adapted to early successional stages and to the dry, sterile soils.

This is the only State location for Wooly Three-awn (Aristida lanosa) and one of two Maryland sites for Pineland Tick-trefoil (Desmodium strictum). Both species are recognized as Endangered by the State.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Aristida lanosa	Woolly Three-awn	Endangered
Desmodium strictum	Pineland Tick-trefoil	Endangered
Lespedeza stuevei	Downy Bushclover	Endangered
Solidago speciosa	Showy Goldenrod	Endangered
Lupinus perennis	Wild Lupine	Threatened
Panicum commonsianum	Commons' Panicgrass	Highly State Rare
Trichostema setaceum	Narrow-leaved Bluecurls	Highly State Rare
Cyperus retrofractus	Rough Cyperus	Highly State Rare
Cyperus grayii	Asa Gray's Cyperus	Watch List
Vitis rotundifolia	Round-leaved Grape	Watch List

OTHER VALUES AND SIGNIFICANCE:

Adjacent landowners would benefit from preservation of this protection area. The Nature Conservancy owns and maintains the Nassawango Creek Preserve, adjacent to the Furnace Protection Area's eastern border. The watershed of Nassawango Creek would be buffered by this new protection area. The Furnace Town Foundation would also benefit because protection of this area would insure that land adjacent to their historical park would remain in a condition consistent with the early settlement atmosphere of the park.

THREATS AND MANAGEMENT NEEDS:

Threats

A potential threat to many of the rare species populations is the paving of Millville Road. Since many of these species require disturbance, they colonize the sandy shoulders of Millville Road. Paving would immediately eliminate these plants, and allow non-native weeds to colonize the new road shoulders. It would be difficult, if not impossible, for the rare native species to recolonize the new road shoulders, particularly in the brighter areas where non-native species flourish.

Management Needs

No active management is required at this time. However, a monitoring program should be established to examine the rare native plant and invasive weed populations. Management agreements with road maintenance crews should be implemented to protect the rare plants.

BOUNDARY RECOMMENDATIONS:

The protection area boundary encompasses all rare species populations and a buffer area on Lakeland soils. The Nature Conservancy land and part of the Furnace Town Foundation land are not included in this protection area because the management practices and land-use policies are already consistent with the protection of the area.

SITE DESCRIPTION SUMMARY:

The focus of this 400 acre protection area is a large woodland in various stages of succession. The entire protection area is located on sandy uplands where low water holding capacity and sterile soils limit shrub growth and thin tree cover. Woodland areas include:

1. 50 year scrub pine/oak - upland and upper slope

2. 10 year pine plantation - upland
3. 10 year pine/oak - upland and upper slope

Transecting the protection area are two roads which intersect at Furnace, a 10-acre historical park with a few buildings and a parking lot. The road running east/west, Furnace Road, is paved and has few rare species along the roadside. The north/south road, Millville Road, is unpaved and sandy. The majority of rare species occur within 10 ft. of this road on both sides. Non-native weeds are abundant along Furnace Road, and are also found near Furnace along Millville Road. Where weeds are present, rare species are less common or absent.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: J. Christopher Ludwig

Date: October 1987

PROTECTION AREA SUMMARY

Protection Area Name: Furnace Road Powerline

County: Worcester USGS Quad: Dividing Creek

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Furnace Road Powerline is kept free of woody species through active management. This open habitat has boggy emergent wetlands and upland meadows where fifteen rare species occur (see list below). In pre-settlement history, fires and floods created and maintained these communities. Since natural causes have been artificially suppressed, powerline right-of-ways provide some of the only habitat for species that require open conditions.

In a dry, forested area adjacent to the powerlines, small fires have eliminated shrubs and thinned trees so that much light reaches the forest floor. Commons' Panicgrass (Panicum commonsianum) and Few-flowered Panicgrass (Panicum oligosanthes), both Highly State Rare, occur here. This habitat type is now rare due to active fire suppression.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Desmodium strictum	Pineland Tick-trefoil	Endangered
Rhynchospora microcephala	Tiny-headed Breakrush	Endangered
Lespedeza angustifolia	Narrow-leaved Bushclover	Threatened
Panicum commonsianum	Commons' Panicgrass	Highly State Rare
Panicum oligosanthes	Few-flowered Panicgrass	Highly State Rare
Rhynchosia tomentosa		Highly State Rare
Listera australis	Southern Twayblade	State Rare
Amphicarpum purshii	Pursh's Amphicarpum	Watch List
Drosera rotundifolia	Round-leaved Sundew	Watch List
Kalmia angustifolia	Sheep Laurel	Watch List
Lycopodium alopecuroides	Fox-tail Clubmoss	Watch List

Platanthera blephariglottis	White-fringed Orchis	Watch List
Platanthera cristata	Crested Yellow Orchis	Watch List
Polygala incarnata	Pink Milkwort	Watch List
Pyrrhopappus carolinianum	False Dandelion	Watch List
Rhododendron atlanticum		Watch List
Rhynchospora gracilenta	Slender Beakrush	Watch List
Solidago puberula	Downy Goldenrod	Watch List
Vitis rotundifolia	Round-leaved Grape	Watch List

OTHER VALUES AND SIGNIFICANCE:

The wildlife value of this area is high. In large, unbroken forest tracts, woodland openings with herbaceous growth are ideal for Deer, Bobwhite, and numerous non-game species.

THREATS AND MANAGEMENT NEEDS:

Threats

If current management procedures remain in place, then no serious threats to this area are foreseen. Minor threats include (1) the increasing invasion of weed species, i.e., reed (Phragmites communis), tickseed (Bidens polylepis) and Dog Fennel (Eupatorium capillifolium); and (2) damage to boggy areas due to heavy vehicular traffic through the powerline right-of-way.

Management Needs

Current management practices appear most beneficial for the continued existence of rare species populations and habitats. The populations of rare species and non-native vegetation should be monitored.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes all rare species habitats in the powerline right-of-way and adjacent woodland, plus woodland buffer around these areas.

SITE DESCRIPTION SUMMARY:

Within this 210 acre protection area, a powerline runs north/south and is intersected by Furnace Road. The right-of-way is managed with herbicide treatments to limit woody growth. As a result, the whole line is a mixture of boggy emergent marsh areas and upland meadows. Small streams run through many of the emergent marsh areas, and there are large areas of standing water in the winter and spring. By late summer all of standing water is gone and wetland herbs are quite common. Tiny-headed Beakrush is the rarest species found in the wetlands, and many Watch List Species are found. Upland meadows have a large diversity of upland species with many non-native species in areas closer to Furnace Road. The rarer species found in the upland areas of the right-of-way include Pineland Tick-trefoil, Narrow-leaved Bushclover, and Rhynchosia tomentosa.

Adjacent to the powerline are two interesting areas. First, there is a swampy deciduous woodland containing Southern Twayblade, Sheep Laurel, and Rhododendron atlanticum. The other area is an upland pine forest which has few shrubs and a very thin canopy. The herbaceous understory contains two Highly State Rare grasses, Commons' Panicgrass, and Few-flowered Panicgrass.

Prepared by: J. Christopher Ludwig

Date: October 1987

PROTECTION AREA SUMMARY

Protection Area Name: Hancock Creek

County: Worcester USGS Quad: Girdletree

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Hancock Creek Protection Area contains a large, mature, deciduous forest and swamp, with one of five large and stable populations of Dwarf Trillium (Trillium pusillum) known in Maryland. This species of Trillium is Threatened in Maryland, is known from fewer than 50 sites worldwide, and is a candidate for listing as a Federally Endangered Species.

Like other areas with Dwarf Trillium, the forested area has many species which are otherwise very uncommon on the lower Delmarva peninsula. At this protection area, Virginia Bunchflower (Melanthium virginicum) and Virginia Snakeroot (Aristolochia serpentaria), two Watch List Species, are found at their southern limit on the Delmarva peninsula.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Trillium pusillum	Dwarf Trillium	Threatened
Aristolochia serpentaria	Virginia Snakeroot	Watch List
Melanthium virginicum	Virginia Bunchflower	Watch List

OTHER VALUES AND SIGNIFICANCE:

The upland hardwood forest and deciduous swamp forest provide diverse habitats for forest interior dwelling birds, reptiles, and amphibians.

THREATS AND MANAGEMENT NEEDS:

Threats

Logging within the protection area boundary is the biggest threat to the Trillium at this site. Due to severe disturbance to the habitat, canopy openings created by logging are usually invaded by non-native, weedy species. These weeds may exclude Dwarf Trillium from the site. In addition, hydrological disturbance caused by logging upstream may alter the wetland

habitat sufficiently to eliminate this rare species. Logging activity within the population of Dwarf Trillium would destroy individual plants of this species.

Management Needs

As long as logging is avoided, no special management is needed to protect the site. The Trillium population should be monitored regularly.

The informal agreement established by The Nature Conservancy with the landowner should be maintained in order to promote cooperation in protecting this site.

BOUNDARY RECOMMENDATIONS:

The protection area boundary contains the entire population of Dwarf Trillium, with the upstream forested areas, and the adjacent uplands included as buffer. Within this boundary, active disturbances and the threats mentioned above should be avoided.

SITE DESCRIPTION SUMMARY:

This 25 acre protection area is adjacent to the eastern shoulder of Greenbackville Road along Hancock Creek. Descriptive information was provided by the staff of The Nature Conservancy. Heading east from the crossing of the road, the creek flows through a mature, deciduous swamp. The trees include Tulip Tree (primarily), Red Maple, oaks, and Loblolly Pine. On the south side of the swamp, an old-growth upland woods occurs. In a seepage area between this upland and the swamp is a small population of Virginia Bunchflower. The population of Dwarf Trillium occurs here along the stream and extends downstream about 300 yards. At this point logging has occurred and the Dwarf Trillium has been eliminated.

Prepared by: J. Christopher Ludwig

Date: November 1987

PROTECTION AREA SUMMARY

Protection Area Name: Little Mill Run

County: Worcester USGS Quad: Girdletree

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Little Mill Run Protection Area contains a creek and millpond (Big Millpond) which support three plants that are rare in Maryland. Log Fern (Dryopteris celsa) is a State Endangered Species and is known from only two other sites in the State. It is at the northeastern limit of its range. Dwarf Trillium (Trillium pusillum) is Threatened in the State and is a candidate for Federal Endangered Species status. In Maryland, all known populations of this species occur Worcester County. Watermeal (Wolffia punctata) is also found here and is Highly State Rare.

Mosquito Fern (Azolla caroliniana), a very small fern which floats on still water ponds, was seen in the millpond in 1978. This is the only recent record for this plant in the State. When it is present, it forms large spreading mats. However, it appears irregularly. Although it has not been recorded at this site since 1978, there is a good chance that it is still extant.

Another plant which has been seen in Big Millpond but which does not appear every year is Myriophyllum heterophyllum. It is considered Highly State Rare because it is only known from one other site in Maryland.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Dryopteris celsa	Log Fern	Endangered
Trillium pusillum	Dwarf Trillium	Threatened
Wolffia punctata	Watermeal	Highly State Rare
Azolla caroliniana	Mosquito Fern	State Rare
Myriophyllum heterophyllum		State Rare

OTHER VALUES AND SIGNIFICANCE:

This wetland complex contains a diversity of wetland types including forested swamp, shrub swamp, zones of emergent

vegetation, aquatic bed and open water. The millpond is large (approximately 60 acres in size) and supports healthy Bald Cypress, both in the water and on land. This tree approaches its northern limit of distribution in Worcester County.

These diverse wetlands offer ideal nesting, feeding, and breeding grounds for resident and migratory waterbirds, waterfowl, and songbirds. Fish and birds feed on the extensive Submerged Aquatic Vegetation (SAV) in the millpond. Reptiles and amphibians inhabit the shallow marshes along the perimeter.

THREATS AND MANAGEMENT NEEDS:

Threats

The major threats to Little Mill Run Protection Area are sedimentation and agricultural runoff. Although the creek and pond are surrounded by forest buffer, agricultural fields, clearcutting activity, and residential development are nearby. In at least one case, a ditch constructed to drain a cultivated field carries sediment and possibly herbicides, pesticides, or fertilizers into Little Mill Creek. Increased sedimentation of the creek floodplain may also be seen as a result of housing construction just west of Steel Pond Road.

Forest cutting next to the creek threatens the Log Fern population. The opening of the canopy has allowed weedy species to invade and spread throughout the floodplain in areas which have sufficient light.

Another threat is additional residential development to the north of Little Mill Creek east of Steel Pond Road. The land has already been subdivided into narrow house lots with little buffer of the floodplain to the south. Sediment runoff during construction and afterwards could be detrimental to the Log Fern population as well as to the stream community.

Management Needs

Voluntary management agreements should be implemented with adjacent landowners to encourage land-use practices that are consistent with rare plant protection. The impacts of residential and agricultural runoff should be reduced by installing silt fences and restricting the use of farm chemicals and fertilizers. In addition, timber cutting near the protection area should be avoided. A forested buffer is recommended in order to help maintain the hydrology and to prevent the further invasion of weedy species.

BOUNDARY RECOMMENDATIONS:

The protection area boundary surrounds the mainstem of the creek, its floodplain, and the millpond. These areas contain the

rare plants. The protection area also includes an upland buffer which extends to the tops of the bluffs along the floodplain. Because runoff from the slopes eventually reaches the creek and the millpond, their natural character must be maintained. Finally, the headwaters of the creeks that feed into Little Mill Run are included because they influence water quality downstream.

SITE DESCRIPTION SUMMARY:

This 470 acre protection area encompasses a creek and millpond complex just north of the Virginia border. The upstream end is a forested wetland containing two creeks, Little Mill and Marshall Mill, which join to form Little Mill Run. After flowing about 1.2 miles, the creek opens out into Big Millpond, created by an impoundment just above the creek's tidal limit. The creek is of fairly high water quality and receives only a small amount of sediment from nearby farms. Its 500 ft. wide floodplain supports Log Fern near the uplands east of Steel Pond Road, and Dwarf Trillium on the sphagnum hummocks west of the road.

The forest canopy is thick along most of the stream, consisting of Red Maple, American Holly, Bald Cypress, Spicebush, and other typical wetland species. The herbaceous undergrowth is also thick, dominated by ferns, Lizard's Tail, Virginia Creeper and sphagnum. In a few places east of Steel Pond Road, tornado damage has opened up the forest slightly. Branches of large trees were broken, allowing sunlight to reach the forest floor. This, along with clearcutting just south of the stream, has facilitated the invasion of jewelweed, greenbrier and Japanese Honeysuckle into those areas. The upland to the north of the creek consists of a narrow strip of dry pine forest. In other upland areas beyond the protection area boundaries are agricultural fields.

Spatterdock is common in the one-mile long millpond, and small floating vegetation (including the Watermeal) inhabits the shallow perimeter. Bald Cypress may be seen in the deeper water. The pond margins are swampy and support emergent vegetation such as Swamp Milkweed, sedges, and cattails. The surrounding upland contains shrubs such as Smooth Alder, Wax-myrtle, Sweet Pepperbush and willow. Along the impoundment is a grassy bank with large, well-spaced Bald Cypress trees, and on the western side is a paved boat ramp.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: Abigail Rome

Date: July 1987

PROTECTION AREA SUMMARY

Protection Area Name: Mt. Olive Church Road

County: Worcester USGS Quad: Wango

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This non-tidal wetland complex includes a sphagnum bog which supports healthy populations of three State Endangered Species: Coppery St. John's-wort (Hypericum denticulatum), Canby's Lobelia (Lobelia canbyi), and Pink Bog-button (Sclerolepis uniflora). Aside from this site, there are only two other very small populations of each of the first two plants known in the State. The populations here are, by far, the most vigorous in Maryland. Pursh's Amphicarpum (Amphicarpum purshii) is a Watch List Species also represented here.

Sphagnum bogs are uncommon in Maryland, particularly on the lower coastal plain. The plants inhabiting bogs are often peculiar and fascinating in their adaptations to the highly acidic environment. For example, the Spatulate-leaved Sundew is a carnivorous plant that occurs in this bog. Insects trapped by the plant's sugary secretions provide nutrients to the plants.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Hypericum denticulatum	Coppery St. John's-wort	Endangered
Lobelia canbyi	Canby's Lobelia	Endangered
Sclerolepis uniflora	Pink Bog-button	Endangered
Amphicarpum pushii	Pursh's Amphicarpum	Watch List

THREATS AND MANAGEMENT NEEDS:

Threats

The major threat to this site is drainage and conversion to forest. The surrounding area is managed for pine production and presently at least one drainage ditch runs into the area inhabited by rare plants. If new ditches were dug to drain water from this area towards the road to the south (so that more trees could be planted), this unique wetland community would be destroyed.

A second threat, also related to forestry, is disturbance created by heavy machinery. Bulldozer and skidder traffic across the wetland would destroy plants and alter the hydrology such that the rare plant habitat would be destroyed. A final threat is roadside ditching. Because the bog is close to the road, such ditching would have hydrologic impact on the rare plants and their habitat.

Management Needs

Digging of drainage ditches in the protection area, or in nearby areas which are hydrologically connected, should be prohibited. Forest cutting should also be prevented because the heavy machinery destroys rare plant habitat and canopy opening allows invasion of weedy competitors. In fact, an increase in forest buffer around the bog (especially on the side closest to the road) is highly recommended. This would further shelter the protection area and discourage trespass. Management agreements with both the highway maintenance authorities and with the local forest products companies could serve to implement these management recommendations.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes the bog, the surrounding wetlands which contain Canby's Lobelia and drain into it, and a forested buffer to the west and south. To the north and east, the roads form the boundary.

SITE DESCRIPTION SUMMARY:

The feature of greatest ecological significance in this 15 acre protection area is a two-acre wetland which dries completely in the summer. It is vegetated with grasses, sedges (especially broomsedge), rushes, and wildflowers such as St. John's-wort, Lobelia, and aster. Two of the Endangered Species are dominants and are found throughout. The lowest areas contain sphagnum moss, sundews, clubmoss and yelloweyed-grass. The bog is not entirely open but has small trees and shrubs succeeding in. The dominant woody species are pine, Red Maple, Sweet Gum, Sweet Pepperbush, fetterbush and Meadowsweet. Around the eastern and southern edges is a Loblolly Pine plantation with trees that are approximately 15 years old. To the west is a four-acre, open, sandy rectangle bordered by overgrown hedgerows on all sides. Young pines are encroaching. Finally, on the north side, a narrow forested strip separates the bog from Mt. Olive Church Road.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: Abigail Rome

Date: August 1987

PROTECTION AREA SUMMARY

Protection Area Name: Oak Hall Road Powerline

County: Worcester USGS Quad: Dividing Creek

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This powerline right-of-way contains Maryland's only population of Clasping-Leaved St. John's-wort (Hypericum gymnanthum). Thought to have been extirpated from Maryland, two populations of this species were found in 1987, and this plant is now a State Endangered Species. Neither of these populations is protected. Torrey's Spikerush (Eleocharis microcarpa), a Watch List Species, is also found here.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Hypericum gymnanthum	Clasping-Leaved St. John's-wort	Endangered
Eleocharis microcarpa	Torrey's Spikerush	Watch List

OTHER VALUES AND SIGNIFICANCE:

Many rare plant habitats on the coastal plain are powerline right-of-ways. This is probably because powerline maintenance sustains an open canopy. Many wetland plants are shade intolerant and thrive in these open right-of-ways. Historically, the major natural forces responsible for the creation of open freshwater wetlands were fire and beaver activity. Forest fire suppression and the decimation of beaver populations on the lower Eastern Shore have all but eliminated these habitats.

THREATS AND MANAGEMENT NEEDS:

Threats

Threats to this protection area are related to powerline maintenance. Herbicides are currently being used to kill Sweet Gum trees and other woody plants. If non-selective chemicals are applied indiscriminately, other species may be threatened. Limiting the administration of herbicides to foliar and/or frill applications on woody plants should be considered.
Another related threat is mechanical destruction of plants by vehicular traffic along the right-of-way. Heavy machinery

used during powerline maintenance crushes plants and compacts soils so that plant growth is inhibited.

Management Needs

Management agreements must be implemented with the utility company in order to insure that powerline maintenance practices continue to coincide with rare species protection. Vehicle traffic should be minimized or, preferably, discontinued in the rare species' habitat. More information is needed on the impacts of herbiciding on rare plant demographics. Future studies may yield more specific management recommendations.

BOUNDARY RECOMMENDATIONS:

The protection area consists of the wetland under the powerline right-of-way, and surrounding forest and upland buffer. From the crest of the two hills that delimit the powerline wetland, the protection area extends 0.3 mile in each direction (north and south) of Oak Hall Road. The forested buffer on each side is included in order to ensure that the hydrology is maintained.

SITE DESCRIPTION SUMMARY:

This 40 acre protection area includes a powerline right-of-way located on level, poorly-drained soils. Although Sweet Gums and other trees which grow on either side of the powerline are controlled by herbicide applications, the herbaceous vegetation is allowed to flourish. Grasses, rushes, ragweed, several species of St. John's-worts, Joe-pye-weeds and meadow beauties dominate, growing to heights of three ft. or more. Directly under the powerline to the south of Oak Hall Road and on one side to the north, vegetation is lower and tire tracks are present. Spikerushes and other plants which do not tolerate competition may be seen here. On the slopes which delimit the northern and southern ends of the protection area, the vegetation changes and Joe-pye-weeds and thistles become dominants. The surrounding forest is a mixed oak and pine forest also containing Sweet Gum and Black Gum.

Prepared by: Abigail Rome

Date: August 1987

PROTECTION AREA SUMMARY

Protection Area Name: Pawpaw Creek

County: Worcester USGS Quad: Public Landing

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

A steep, north-facing bluff adjacent to Pawpaw Creek supports Single-headed Pussytoes (Antennaria solitaria), a State Threatened Species. This plant is found at only four sites in Maryland, and is at the northeastern limit of its range. Twisted Spikerush (Eleocharis tortilis), considered Highly State Rare, is also found here.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Antennaria solitaria	Single-headed Pussytoes	Threatened
Eleocharis tortilis	Twisted Spikerush	Highly State Rare

OTHER VALUES AND SIGNIFICANCE:

Bluffs as high as 25 ft. line the creek, exhibiting a degree of topographic relief unusual for the lower coastal plain. Several seeps are present and these, as well as the steep slopes, support rich vegetation more characteristic of the Piedmont. A diversity of wildflowers carpet the forest in spring.

THREATS AND MANAGEMENT NEEDS:

Threats

The streamside community is a relatively natural one, not highly impacted by man. The major potential threat is a decline in water quality as a result of upstream agricultural runoff or forest cutting. The Single-headed Pussytoes population is also subject to a more specific threat: erosion of the bluff it inhabits. Because the slope is undercut, it is highly subject to slumping. The forested buffer will help to prevent erosion from rain and wind. High spring river flow will continue to erode the bluff from below and create new habitat that may be colonized by the Single-headed Pussytoes.

Twisted Spikerush is threatened by use of the now abandoned forest roads. This rare plant grows in the roadway and any vehicular traffic would destroy it.

Management Needs

Nearby land-use activities should be monitored for potential effects on the watershed. This would ensure high water quality. In addition, large-scale cutting of the forest near the Twisted Spikerush must be avoided. Instead, handcutting or pruning of nearby trees and shrubs would help to promote the population by providing light for the bog community.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes each of the rare plant populations and a buffer. Pawpaw Creek east of the road and the surrounding richly vegetated bluffs represent the core of the protection area. By protecting them, the unique streamside community may be preserved. The old forest roads which support Twisted Spikerush and the adjacent woods which drain into them are a second area of concern which must remain undisturbed. A forested buffer around the upstream area of Pawpaw Creek is incorporated to ensure the maintenance of water quality.

SITE DESCRIPTION SUMMARY:

The steep slopes that border Pawpaw Creek are the features of greatest ecological significance in this 175 acre protection area. This small creek originates at 40 ft. in elevation and travels eastward, quickly dropping to sea level to enter Chincoteague Bay at Public Landing. The middle section of the creek has numerous meanders and, although water flow may be high in the winter and spring (a result of the bluffs which concentrate runoff from the surrounding forest), the creek dries in the summer.

Once reaching an elevation of about 5 ft., the creek opens out into a small swamp, soon reaching its tidal limit. The surrounding forest is fairly dry in the uplands, consisting mainly of Red Maple, oaks, dogwood, Tulip Poplar, Sassafras, and hickory. It becomes slightly wetter near the stream. The steep bluffs (which are unusual in the coastal plain) provide habitat for plants more common in the Piedmont. These include Bloodroot, Enchanter's Nightshade, grape fern and Wild Geranium. In a few spots the river channel undercuts the stream bank, creating overhangs up to 12 ft. high. It is here that Single-headed Pussytoes is found.

South of the creek are several forested tracts being managed commercially. The vegetation is predominantly 20 year-old pines with a dense, shrubby understory. A network of old, overgrown

roads laces the area, and in low-lying spots boggy conditions are found. Twisted Spikerush grows here among sphagnum moss and other grasses and sedges.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: Abigail Rome

Date: July 1987

PROTECTION AREA SUMMARY

Protection Area Name: Pikes Creek

County: Worcester USGS Quad: Girdletree

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Pikes Creek Protection Area contains one of five large, stable populations of Dwarf Trillium (Trillium pusillum) known in Maryland. This species of Trillium is Threatened in Maryland, is known from fewer than 50 sites worldwide, and is a candidate for listing under the U.S. Endangered Species Act.

Like other woods inhabited by Dwarf Trillium, the forest here contains many species which are otherwise very uncommon on the lower Delmarva peninsula.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Trillium pusillum	Dwarf Trillium	Threatened

OTHER VALUES AND SIGNIFICANCE:

This hardwood swamp forest provides habitat for forest interior dwelling birds, amphibians, and reptiles.

THREATS AND MANAGEMENT NEEDS:

Threats

Logging within the protection area boundary is the biggest threat to the Trillium at this site. Due to severe disturbance to the habitat, canopy openings created by logging are usually invaded by non-native, weedy species. These weeds may exclude the Dwarf Trillium from the site. In addition, hydrological disturbance caused by logging upstream may alter the wetland habitat sufficiently to eliminate the rare species. Logging activity within the population of Dwarf Trillium would destroy individual plants of this species.

Management Needs

If logging is avoided, no special management is needed to protect the site. The size and reproductive success of the Trillium population should be monitored.

BOUNDARY RECOMMENDATIONS:

The protection area boundary contains the entire population of Dwarf Trillium, the upstream forested areas, and the adjacent uplands as buffer. Within this boundary, active disturbances and the threats mentioned above should be avoided.

SITE DESCRIPTION SUMMARY:

This 65 acre protection area is located along Pikes Creek adjacent to the western bank of Rte. 12. The Creek is forested on both sides with mature Tulip Tree and Red Maple. The first 100 yds. next to Rte. 12 are very weedy as are the edges of the forest about 200-500 ft. from the stream channel. The Dwarf Trillium is first found 200 yds. from the road, close to the stream. A few mature Bald Cypress are also in this area. The Trillium is found in patches of 20-200 individuals up the stream valley for 200-400 yds. Beyond the Trillium, an elevated earthen dike runs perpendicular to the stream.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: J. Christopher Ludwig

Date: November 1987

PROTECTION AREA SUMMARY

Protection Area Name: Porter Neck

County: Worcester USGS Quads: Berlin, Ninepin Branch

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

Porter Neck Protection Area is a densely forested wetland which, at its margins and in slightly wetter areas, contains three species of rare plants. Hairy Ludwigia (Ludwigia hirtella), a State Endangered Species, is known from only one other site in Maryland. Southern Twayblade (Listera australis), considered Rare in the State, is also represented at this site. Finally, Crested Yellow Orchis (Platanthera cristata), a Watch List Species, is especially showy here.

Spreading Pogonia (Cleistes divaricata) was recorded at this site in 1982. It is a State Endangered Species which is considered rare throughout most of its range, and has been found in only one other site in Maryland. Because the species is known to remain dormant for several years at a time, and because its habitat has been maintained, there is a good chance that it still occurs here.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Cleistes divaricata	Spreading Pogonia	Endangered
Ludwigia hirtella	Hairy Ludwigia	Endangered
Listera australis	Southern Twayblade	State Rare
Platanthera cristata	Crested Yellow Orchis	Watch List

OTHER VALUES AND SIGNIFICANCE:

This pine-hardwood swamp forest provides habitat for amphibians, reptiles, and forest interior dwelling birds.

THREATS AND MANAGEMENT NEEDS:

Threats

Disruption of the local hydrology threatens the survival of the rare, wetland species. Woody vegetation is encroaching upon the herbaceous openings inhabited by rare species. If this continues, the populations of rare species may be eliminated.

Trampling is also a threat to these plants. The Hairy Ludwigia is located close to the road in an open sandy spot which is easily accessible. In fact, the area seems to be used as a trailhead for hunters.

Another threat is forest clearing, either for agricultural or residential purposes. The latter seems more likely since the land across the street has been recently subdivided into house lots, and a proposal has been made to do the same on the protection area side.

Management Needs

Management needs include maintaining some open areas for the Ludwigia since it thrives in sandy swamps and ditches with little or no forest canopy. Hand pruning of trees and shrubs would be most effective, and is currently being practiced at this site. Local hydrology should be monitored to determine if groundwater is being depleted. This study may produce recommendations concerning local ditching.

BOUNDARY RECOMMENDATIONS:

The protection area boundary consists of the forested swamp between Bassett Creek and Cropper Neck Road as well as adjacent upland. The dry upland forest, which is located on sandy soils, is included because it serves as a groundwater recharge area for the swamp. Protecting forest cover would maintain water quality and flow.

SITE DESCRIPTION SUMMARY:

The majority of this 175 acre protection area is forested wetland containing a mixed pine-hardwood forest. Dominant species include Red Maple, Sweet Gum, Loblolly Pine, Black Gum, American Holly, Sweet Pepperbush and blueberry. At the northern border is Bassett Creek, a brackish creek which was once impounded (Bassett Millpond) and which drains into Chincoteague Bay. To the east (outside the protection area) are open sand mines.

Southern Twayblade and Crested Yellow Orchis grow among sphagnum moss and ferns in the wettest areas near the origins of two tributaries into Porter Creek. The soils have a surface layer of peat over sandy subsoil. Near the headwaters of the western tributary, an open pond approximately 1/2 acre in size has been created. It drains into a narrow, wooded channel for about 50 ft. before reaching a culvert at the road.

The other boggy stream origin is slightly more open and is used as a path by hunters. It opens out to the roadside where

the Hairy Ludwigia is found. Other dominant plants include sundew, bog clubmoss, St. John's-wort, Colicroot, and other wetland species that do well in sandy soils that are alternately very wet or very dry. At wetter times of year there may be standing water here and in the adjacent roadside ditch which drains into a culvert under Cropper Neck Road. South of the road the creek surfaces into an open tidal channel.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: Abigail Rome

Date: June 1987

PROTECTION AREA SUMMARY

Protection Area Name: Powell Creek

County: Worcester USGS Quad: Girdletree

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Powell Creek Protection Area contains a mature deciduous forest and swamp with one of five large stable populations of Dwarf Trillium (Trillium pusillum) known in the State. This species of Trillium is Threatened in Maryland, is known from fewer than 50 sites worldwide, and has been considered by the U.S. Fish and Wildlife Service for listing under the U.S. Endangered Species Act.

Like other areas with Dwarf Trillium, the forested area has many species which are otherwise very uncommon on the lower Delmarva peninsula.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Trillium pusillum	Dwarf Trillium	Threatened

OTHER VALUES AND SIGNIFICANCE:

The hardwood swamp forest and adjacent upland forest provide diverse habitats for forest interior dwelling birds, reptiles, and amphibians.

THREATS AND MANAGEMENT NEEDS:

Threats

Logging within the protection area boundary is the biggest threat to the Trillium at this site. Due to severe disturbance and increased sunlight, canopy openings created by logging are usually invaded by non-native, weedy species. These weeds may exclude Dwarf Trillium from the site. In addition, hydrological disturbance caused by logging upstream may alter the wetland habitat sufficiently to eliminate this rare species. Logging within the population of Dwarf Trillium would destroy individual plants of this species.

Management Needs

If logging is avoided, no special management is needed to protect the site. The Trillium population's size and reproductive success should be monitored.

BOUNDARY RECOMMENDATIONS:

The protection area boundary contains the entire population of Dwarf Trillium, the upstream forested areas, and the adjacent uplands as buffer. Within this boundary, active disturbances and the threats mentioned above should be avoided.

SITE DESCRIPTION SUMMARY:

This 55 acre protection area encompasses part of Powell Creek. The creek runs north/south and is forested along most of its length. At the VA/MD border, the stream valley is overgrown with large patches of greenbrier. About 100 yds. upstream, the shrub layer thins and many interesting wetland herbs occur, including Wood Anemone, Green Woodland Orchid, Chain Fern, Jack-in-the-pulpit, Cowbane, and Turtlehead. This is where the Dwarf Trillium first appears. Shrubs seen here include Spicebush and Swamp Withe-rod. Trees include Red Maple and Tulip Tree. A large old-growth Beech forest is adjacent to the west side of the stream valley. The Trillium population extends up the stream valley for another 500 yds.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: J. Christopher Ludwig

Date: November 1987

PROTECTION AREA SUMMARY

Protection Area Name: Spearin Road Powerline

County: Wicomico/Worcester USGS Quad: Salisbury

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Spearin Road Powerlines Protection Area has a right-of-way which is kept free of woody species through active management. This open habitat has boggy emergent wetlands and upland meadows where ten rare species occur (see list below). In pre-settlement history, fires and floods created and maintained these communities. Since these natural disturbance phenomena are now artificially suppressed, the only remaining suitable habitat for species which require these open conditions is along and in powerline right-of-ways.

The largest State population of Barratt's Sedge (Carex barrattii) occurs in this protection area. This species is endangered in Maryland, is known from fewer than 100 sites worldwide, and is under consideration by the U.S. Fish and Wildlife Service as a Federally Endangered Species. This population of Dwarf Iris (Iris verna) is also the larger of the two known populations in Maryland. Nearly one thousand flowering plants were observed in the powerline in 1987.

In the early 1980's Few-flowered Nutrush (Scleria pauciflora) was found in this powerline, the only recent sighting on the Delmarva peninsula. Slender Nutrush (Scleria minor), a State Endangered Species, was also found - one of two recent Delmarva sightings.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Carex barrattii	Barratt's Sedge	Endangered
Hypericum gymnanthum	Clasping-leaved St. John's-wort	Endangered
Iris verna	Dwarf Iris	Endangered
Prenanthes autumnalis	Slender Rattlesnake-root	Endangered
Rhynchospora torreyana	Torrey's Beakrush	Endangered
Scleria minor	Slender Nutrush	Endangered

Amphicarpum purshii	Pursh's Amphicarpum	Watch List
Crotonopsis elliptica	Rushfoil	Watch List
Iris prismatica	Slender Blue Flag	Watch List
Lycopodium alopecuroides	Fox-tail Clubmoss	Watch List
Pyrrhopappus carolinianus	False Dandelion	Watch List
Scleria pauciflora	Pappilose Nutrush	Watch List

OTHER VALUES AND SIGNIFICANCE:

With additional investigation, this area should yield additional rare plants, and may turn up rare moths and butterflies that favor special plants growing in habitats created by powerline right-of-ways.

THREATS AND MANAGEMENT NEEDS:

Threats

Non-native weed species are invading the more disturbed areas of the powerline right-of-way and are competing with native species. Many of these weeds establish when off-road vehicles and logging equipment compact and disturb the soils.

Management Needs

Current management practices do not appear to be detrimental to the rare species populations and habitats. The populations of rare species and non-native, weedy species should be monitored regularly. The use of off-road vehicles should be prohibited within the protection area.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes all powerline right-of-way areas containing rare species and a woodland buffer along the right-of-way. A small portion of a cornfield and Spearin Road, which bisect the right-of-way, are included due to their proximity to the rare species habitat. Runoff from the field and roadside management may affect the rare species.

SITE DESCRIPTION SUMMARY:

The 90 acre protection area contains approximately 1.5 miles of 100 yd.-width powerline right-of-way. The line runs southwest

to northeast. Bisecting the right-of-way near the northeastern end is Spearin Road and a cornfield, which extends 200 yds. along the right-of-way. Northeast of Spearin Road, three rare species, Clasping-leaved St. John's-wort, Rushfoil, and False Dandelion are found within 100 yds. of the road. The other rare species are found southeast of Spearin Road (and the adjacent cornfield). Both areas have sparse woody vegetation and a rich herbaceous flora due to periodic herbicide applications. Wetland areas contain Slender Iris and Barratt's Sedge, while dry areas have large patches of Wooly Ragwort. Most non-native, weedy species are found along the powerline right-of-way in three areas: 1) adjacent to the southwest edge of the cornfield; 2) where heavy off-road vehicle traffic has occurred in the far southwest section; and 3) immediately adjacent to Spearin Road.

Prepared by: J. Christopher Ludwig

Date: October 1987

PROTECTION AREA SUMMARY

Protection Area Name: Sturges Creek Powerline

County: Worcester USGS Quad: Wango

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

The Sturges Creek Powerline Protection Area contains a great variety of habitats and diversity of rare plant species. The sandy wetland and upland soils fall under an array of management practices creating a variety of habitats, including seasonal pools, permanent ditches, wet meadows, sphagnous seepage areas, bogs, dry sandy meadows, deciduous swamp forest, and deciduous and upland pine forest. Eight State Endangered plant species and eight other significant plants can be found in this great diversity of habitats. Three of the Endangered Species, Red Milkweed, (Asclepias rubra), Slender Nutrush (Scleria minor), and Grass-Pink (Calopogon tuberosus), occur in only one other location in Maryland.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Asclepias rubra	Red Milkweed	Endangered
Calopogon tuberosus	Grass-Pink	Endangered
Carex venusta	Dark Green Sedge	Endangered
Prenanthes autumnalis	Slender Rattlesnake-root	Endangered
Rhynchospora microcephala	Tiny-headed Beakrush	Endangered
Rhynchospora torreyana	Torrey's Beakrush	Endangered
Sagittaria engelmanniana	Engelmann's Arrowhead	Endangered
Scleria minor	Slender Nutrush	Endangered
Eleocharis tortilis	Twisted Spikerush	State Rare
Drosera rotundifolia	Round-leaved Sundew	Watch List
Kalmia angustifolia	Sheep Laurel	Watch List
Lycopodium alopecuroides	Fox-tail Clubmoss	Watch List

Platanthera blephariglottis	White-fringed Orchid	Watch List
Platanthera cristata	Crested Yellow Orchid	Watch List
Rhododendron atlanticum		Watch List
Rhynchospora gracilenta	Slender Beakrush	Watch List

OTHER VALUES AND SIGNIFICANCE:

Many rare native plants that require wet, sandy, open habitats have been extirpated from Maryland. Preservation of this habitat type would help to prevent the further loss of species. Additionally, this area provides a variety of suitable habitats for recolonization. The variety of habitats also increases the value of the area to many animal species.

THREATS AND MANAGEMENT NEEDS:

Threats

A change of powerline right-of-way management could eliminate habitat and reduce numbers of rare species. Ditching may also eliminate habitat and reduce species numbers. Continued conversion of the area to Loblolly Pine forest threatens woodland species diversity.

Management Needs

The management of the powerline right-of-way should be monitored for effects on the diversity of habitats and species in the right-of-way. If the current management of herbicide application maintains habitat and species diversity, then the management technique should continue. If the area's diversity is decreasing, other management techniques which can protect the right-of-way's plant diversity should be studied.

Further ditching of this area should be prohibited.

Further conversion of deciduous forest to Loblolly Pine is not recommended for the area.

Scleria minor and Carex venusta populations should be monitored to ascertain if pines will shade out and eliminate these species.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes all rare species habitat and surrounding areas which provide buffer. Within this

boundary the management recommendations listed above should be implemented and active disturbance should be prevented.

SITE DESCRIPTION SUMMARY:

The focus of this 120 acre protection area is a large wetland which is intersected by a powerline right-of-way, clearcut, pine plantation, road, and forest. Many low, wet areas are inhabited by rare species. The sandy wetland types include forested swamp, herbaceous emergent marshes, ditches, seasonal pools, and bogs. Upland sandy areas are present which intersect the powerline, road, and forest. Little non-native vegetation is found, even on the roadsides.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: J. Christopher Ludwig

Date: August 1987

PROTECTION AREA SUMMARY

Protection Area Name: Tanhouse Creek

County: Worcester USGS Quad: Public Landing

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This protection area supports a population of Dwarf Trillium (Trillium pusillum), a State Threatened Species. It is also a candidate for Federal Endangered Species status because this particular variety (var. virginianum) is found in only one county in Maryland and five counties in coastal Virginia.

ELEMENT SUMMARY TABLE:

Element Name	Common Name	Status
Trillium pusillum	Dwarf Trillium	Threatened

OTHER VALUES AND SIGNIFICANCE:

This protection area contains a floristically diverse forest which supports numerous plant species not typical of the lower coastal plain. The relief along the creek is unusual for the lower coastal plain. The plants found here are more common in the Piedmont and upper coastal plain, and indicate rich, well-drained soils.

The protection area also includes a small section of brackish tidal marsh. Such marshland is exceptionally productive, supporting numerous invertebrates which form the basis of the food chain.

THREATS AND MANAGEMENT NEEDS:

Threats

Forest cutting is a significant threat to this natural community. It would eliminate the rich woods habitat and, because of the steep (i.e., for the coastal plain) bluffs, would cause sedimentation of the stream. In fact, some siltation is already visible in the stream in areas adjacent to agricultural fields. Uncontrolled soil erosion, as well as runoff of farm chemicals and fertilizers, can reduce water quality and harm Trillium habitat in the lowest, wettest areas. In addition, non-native, weedy species invade openings created by logging. These weeds may exclude Dwarf Trillium from the site.

Management Needs

Forest cutting should be avoided. In addition, agricultural runoff must be diverted away from the creek. Agreements with local landowners should be arranged in order to implement these management recommendations.

BOUNDARY RECOMMENDATIONS:

The protection area boundary surrounds the forested upland zones as well as the low swamp forest. It extends to agricultural lands that drain into the tributaries which form the headwaters of Tanhouse Creek. Including these ensures protection of downstream water quality. At the lower end, the boundary runs for about 0.6 mile from the confluence of the two major tributaries. This section of the creek is undisturbed brackish marsh and provides habitat for numerous productive tidal marsh species. A buffer of forest on either side is also included here.

SITE DESCRIPTION SUMMARY:

The primary feature of ecological significance in this 250 acre protection area is a forested wetland located at the headwaters of Tanhouse Creek. Its unique character results from the high degree of topographic variation: 35 ft. bluffs descend from an elevation of 40 ft. to the flat coastal plain. The creek originates from two narrow tributaries which flow from the uplands (which are now being farmed) and then descend quickly. At the base of the bluffs, the diverse herbaceous flora includes Toothwort, Bloodroot, Showy Orchis, Pennywort, Violet Wood Sorrel, Spring Beauty and Rattlesnake Fern. The canopy consists of several oak species, pine, dogwood, hickory and Tulip Poplar. The swamp below is dominated by Red Maple, Black Gum, Sweet Gum, ash, Sweet Pepperbush, fetterbush, American Holly, ferns, and Jack-in-the-pulpit. It is in the wettest areas, among sphagnous hummocks along the creek, that the rare Trillium is found. The forested wetland continues to the east but soon becomes a brackish tidal marsh as it approaches Chincoteague Bay. Emergent vegetation here is dominated by Smooth Cordgrass, Meadow Cordgrass, Carolina Sea Lavender, Spikegrass, Groundselbush and Marsh Elder.

Descriptive information was obtained from field surveys conducted prior to 1987. Current aerial photographs were examined to update the existing survey data.

Prepared by: Abigail Rome

Date: September 1987

PROTECTION AREA SUMMARY

Protection Area Name: West Ocean City Pond

County: Worcester USGS Quad:

SUMMARY OF ECOLOGICAL SIGNIFICANCE:

This large but shallow freshwater pond contains several rare aquatic plants that form large beds of submerged and emergent aquatic vegetation. This is the only State site for Sessile-fruited Arrowhead (Sagittaria rigida).

In addition to providing habitat for the rare plant species, the West Ocean City Pond is a well-known stop-over for migrating and wintering waterfowl. The pond also provides a feeding grounds for resident herons, egrets, ibis, gulls, and terns. Waterfowl and fish find a rich food supply in the large aquatic plant beds.

ELEMENT SUMMARY TABLE

Element Name	Common Name	Status
Myriophyllum humile	Low Water-milfoil	Endangered
Sagittaria rigida	Sessile-fruited Arrowhead	Endangered
Eleocharis quadrangulata	Angled Spikerush	Watch List
Sagittaria graminea	Grass-leaved Arrowhead	Watch List

OTHER VALUES AND SIGNIFICANCE:

Further investigation of the pond's rich aquatic flora may yield the discovery of additional rare species, particularly during years of low or high water levels. In addition, the pond is frequently used by birdwatchers who recognize the area as a good location to regularly find coastal resident species as well as unusual vagrants.

THREATS AND MANAGEMENT NEEDS:

Threats

Any removal of forested buffers or forested portions of the watershed threatens the wetland with siltation, shortening the

lifespan of the pond. Eutrophic conditions could result if excessive fertilizer is used in nearby agricultural fields.

Management Needs

The constant water regime of this pond should be maintained in order to preserve the rare species. Drastically altering water levels could eliminate many species.

BOUNDARY RECOMMENDATIONS:

The protection area boundary includes the pond, an upland buffer, and a small portion of the wooded watershed. Within this boundary, active disturbances and the threats mentioned above should be avoided.

SITE DESCRIPTION SUMMARY:

This 55 acre protection area encompasses West Ocean City Pond, a large, artificial pond with a thin forest buffer and a partially-forested watershed. At least 50% of the pond is an emergent wetland dominated by Angled Spikerush and Sessile-fruited Arrowhead, a State Endangered Species known in Maryland at this single site. The deeper portions of the pond contain beds of aquatic vegetation, including an abundance of Hornwort. Willow is invading the shallow southern edge of the pond. Wildlife, particularly birds, are abundant. The aesthetic value of the pond is high.

Prepared by: J. Christopher Ludwig

Date: August 1987

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The following general references are provided as background material and suggested reading to supplement this report.

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Title 08
DEPARTMENT OF NATURAL RESOURCES

Subtitle 03 WILDLIFE

08.03.08 Threatened and Endangered Species

Authority: Natural Resources Article, §§4-2A-01 — 4-2A-09 and §§10-2A-01 — 10-2A-09, Annotated Code of Maryland

Notice of Proposed Action
[87-061-P]

The Secretary of Natural Resources proposes to repeal existing Regulations **.01** and **.02** under **COMAR 08.03.08 Nongame and Endangered Species** and to adopt new Regulations **.01 — .11** under **COMAR 08.03.08 Threatened and Endangered Species.**

The proposed action does not affect any threatened and endangered species regulation or designations under **COMAR 08.02.12 Tidewater Administration.** The proposed action includes an increase in the number of wildlife species on the lists and for the first time includes plants. In addition, some species which meet the statutory definition of fish because they spend part of their life cycle in water, namely, amphibians, reptiles, crustaceans, mollusks and only those finfish of the species Blackbanded Sunfish (Enneacanthus chaetodon), Maryland Darter (Etheostoma sellare), Glassy Darter (Etheostoma vitreum), Stripeback Darter (Percina notograma) and Trout-Perch (Percopsis omiscomaycus) are added. The latter species are not game or sport fish, therefore, are of no commercial significance. The lists also contain, for the first time, the names of all those species which are federally listed and, therefore, are required by Maryland law to be listed in Maryland.

The criteria for listing and delisting species are set out and the process for petitioning the Department to list and delist a species as allowed by law is specified. The proposal also clarifies how to apply for the various permits which are allowed by law and what factors are considered before they are issued.

Maryland law authorizes the Secretary to prohibit certain acts with respect to threatened and endangered plants in addition to those set out in the statute. The added prohibitions are: taking threatened and endangered plants from private property without the permission of the owner and from State property without the permission of the Director; and exporting, possessing, processing, selling, offering for sale, delivering, carrying, transporting or shipping threatened plant species. The latter acts are already prohibited by statute with respect to endangered plants.

Maryland law also authorizes the Secretary to prohibit by regulation certain acts with respect to all other threatened species besides plants. Since there were no threatened species listed in the previous regulation, there were no additional prohibitions specified; thus, these regulations implement that section of the law for the first time. Included in the added prohibitions is an "incidental taking." This is a taking of a species which is caused by another otherwise lawful act, for example, the killing of a pond dwelling species by filling in a pond for other reasons. The landowner is required to give the Department 30 days notice before starting any action which would result in an "incidental taking." Within that 30 day time period the Department must either salvage the species or issue a permit for the "incidental take." The other added prohibitions are simply the same acts prohibited by statute with respect to endangered species.

This proposal defines for the first time what criteria are considered for designating Natural Heritage Areas. These Areas are an integral feature of the Critical Areas Criteria (set forth under **COMAR 14.15.01 — .11**) and by adding this regulation the Department hopes to aid the counties and the Critical Areas Commission in the protection of these Areas. Before Areas are designated the Department will notify all landowners of the proposed designation. There will be maps made available along with other pertinent and useful information. The Department hopes to work out management agreements with the landowners or buy conservation easements for property included in an Area if necessary.

The Critical Areas Criteria rely heavily on the Department's Threatened and Endangered Species Program to aid the counties in determining which species within the Critical Area need protection. The Department has available maps which locate listed species by planning zones and will make all this information as readily available as possible. The Department has always considered cooperative management agreements with private property owners to be the best way to preserve and protect habitat critical to threatened and endangered species, and intends to continue to use these agreements and other mutually agreeable management arrangements as much as possible.

Estimate of Economic Impact

I. Summary of Economic Impact. Administrative costs for units of the Department of Natural Resources will increase in terms of more staff time to address protection of these species, and some land acquisition costs will be incurred. Local governments will bear some costs in addressing protection of the listed species as part of their Critical Areas programs.

II. Types of Economic Impacts:	Revenue (+) Expense (−)	Amount
A. On issuing agency:		
1. Increased staff and support for threatened and endangered species Program	(−)	$193,497
2. Increased land acquisition staff and support	(−)	$74,106
3. Additional acquisition of interests in land	(−)	Indeterminable
B. On other State or local agencies affected:		
Local jurisdictions protect threatened and endangered species as part of Critical Areas programs	(−)	$40,000 — $100,000
C. On regulated industries or trade groups:	NONE	
	Benefit (+) Cost (−)	
D. On other industries or trade groups affected:	NONE	

E. Direct and indirect effects on public:		
1. Prohibition on taking endangered wildlife may affect some real estate development	(−)	Indeterminable
2. Protect species' diversity	(+)	Indeterminable

III. Assumptions. (Identified by Impact Letter and Number from Section II):

A1. The amount indicated is a budget enhancement request for six new positions plus support for the Threatened and Endangered Species program. While not all attributable to the listing of species represented by this regulation, a significant portion of the additional staff time for which the new resources will be needed is to meet the needs of an expanded list of threatened and endangered species.

A2. The amount indicated is a budget enhancement request for two new positions plus support for acquisition of interests in land that may prove necessary to protect threatened and endangered species.

A3. At this time, it is impossible to calculate how much could be spent for acquisition of interests in land. The figure indicated is the amount budgeted in FY 1987 for acquisition of interests in property for protection of lands that support diverse ecological communities of plants or animals, including forestlands, habitats of rare, threatened or endangered species, and areas necessary for watershed protection. A similar amount has been requested for FY 1988.

B. The costs of local governments to develop Critical Area programs will be approximately $2,150,000 for FY 1987. A similar amount has been requested for FY 1988. The Director of the Critical Areas program estimates that between 2 percent and 5 percent of these costs may be attributable to that portion of the work involving threatened and endangered species.

E1. and E2. There is presently no trade in Maryland in any of the listed species, and therefore no impact is anticipated as a result of prohibiting such commerce. The prohibition on taking endangered species of wildlife in any manner will have some localized impacts on land use, but the impacts are indeterminable at this time. As to endangered or threatened species of plants, threatened species of wildlife, and wildlife species in neeed of conservation, the regulation prohibits only directed efforts to take the species; incidental impacts on the species from legitimate uses of land are not prohibited. Therefore, the listing of these species will not have an impact. Finally, there will be a long-term, positive, but incalculable benefit to the people of Maryland by protecting the diversity of species in the State.

Opportunity for Public Comment

Written comments may be sent to James Mallow, Forest, Park and Wildlife Service, Department of Natural Resources, Tawes State Office Building, Annapolis, MD 21401 or call 974-3771 Monday through Friday, 9 a.m. to 4 p.m. Public comment must be received not later than April 20, 1987 at 4 p.m.

If sufficient interest is shown a public hearing will be held. Copies of this proposal are available from James Mallow at the address given above.

.01 Definitions.

A. "Director" means the Director of the Maryland Forest, Park and Wildlife Service.

B. "Endangered extirpated species" means any species that was once a viable component of the flora or fauna of the State but for which no naturally occurring populations are known to exist in the State. Most of these species have not been recorded in Maryland since 1950.

C. "Endangered species" means any species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy including any species determined to be an "endangered species" pursuant to the federal Endangered Species Act of 1973, 16 U.S.C. §§1531 — 1543.

D. "Incidental taking" means takings of listed species that are incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by a person on private property.

E. "Jeopardize the continued existence of" means to engage in an action which reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of either the survival or recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of a listed species or otherwise adversely affecting the species.

F. "Listed species" means a species of flora or fauna deemed endangered, threatened or in need of conservation in this chapter due to any of the following factors:

(1) Present or threatened destruction, modification, or curtailment of the species' habitat or range;

(2) Overutilization for commercial, sporting, scientific, educational, or other purposes;

(3) Disease or predation;

(4) Inadequacy of existing regulatory mechanisms; or

(5) Other natural or manmade factors affecting the species' continued existence within the State.

G. "Natural heritage area" means any natural community of species designated in Regulation .10 in this chapter.

H. "Person" means any county, municipal corporation, or other political subdivision of the State, an individual, corporation, receiver, trustee, guardian, executor, administrator, fiduciary, or representative.

I. "Secretary" means the Secretary of the Department of Natural Resources.

J. "Service" means the Maryland Forest, Park and Wildlife Service.

K. "Species" means any species of wildlife or plant and reptiles, amphibians, crustaceans, mollusks and the following finfish: Enneacanthus chaetodon, Etheostoma sellare, Etheostoma vitreum, Percina notograma, Percopsis omiscomaycus or any part, egg, offspring, or dead body of any of them.

L. "Species in need of conservation" means any species determined by the Secretary to be in need of conservation measures for its continued ability to sustain itself successfully.

M. "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.

N. "Threatened species" means any species of flora or fauna which appears likely, within the foreseeable future, to become endangered including any species determined to be a "threatened species" pursuant to the federal Endangered Species Act of 1973, 16 U.S.C. §§1531 — 1543.

.02 Petitioning.

A. Except for species determined to be threatened or endangered pursuant to the federal Endangered Species Act of 1973, 16 U.S.C. §§1531 — 1543, any interested person may petition the Director to add or remove a species or natural heritage area to or from a list in this chapter. The Director shall review the evidence regarding the requested action and make a recommendation to the Secretary whether or not to list or delist the species or natural heritage area.

B. In a petition to list or delist a natural heritage area, the following information shall be provided:

(1) A map of the proposed natural heritage area.

(2) A description of the physical boundaries of the proposed area, total acreage, landowner name and address.

(3) A description of the biological community represented by the natural heritage area including, as far as practical, a list of the fauna and flora there, and other geologic,

hydrologic, or other features which blend together to make this area unique.

(4) A description of all major threats to the continued existence of the area, or if petitioning to delist an area, a description of how the natural features and species composition of the area have changed so it is no longer suitable to be designated as a natural heritage area.

(5) A statement indicating why the area should or should not be considered as among the best statewide examples of its kind.

(6) Other relevant information which might assist the Director in making a determination.

C. All sites used for evidence of current abundance shall be extant and all sitings shall be documented with appropriate vouchers. In a petition to list or delist a species, the following information shall be provided:

(1) A description of the biological distribution of the species in Maryland.

(2) Its life needs and habitat requirements.

(3) Evidence of its decline or evidence that it is more common than previously believed and documented.

(4) All known threats which jeopardize its continued existence.

(5) Other relevant biological and ecological data or other life history information pertinent to its status.

(6) The species shall be presently recognized as a valid species, or infraspecific taxa of regional or national significance. There shall be adequate documentation that it occurs naturally and is permanently established in Maryland.

.03 Permits.

A. Permits to take, transport, possess, sell, offer for sale, export or import any listed species may be obtained from the Director only after written application on a form provided by the Service, and upon payment of a fee of $25.

B. Each permit shall be subject to an expiration date and other limitations as may be prescribed by the Director.

C. Each permit application requesting permission to take a listed species from private property shall be accompanied by a signed statement from the landowner granting the applicant permission to enter the property to take the species.

D. A permit application shall describe the purpose of the request in such detail that the Director can determine whether it is in the best interest of the species and the State to issue it.

E. The Director shall consider, but not be limited to, the following information:

(1) The number of other known occurrences of the species in the State;

(2) Which of the occurrences of the species in §E(1) exist on:

(a) Private lands;

(b) Public lands; and

(c) What protection there is for the species' continued existence.

(3) The number of individuals in the occurrences of the species in §E(1) and the relative state of ecological stability.

F. Violation of any provision or restriction of the permit shall constitute a violation of this regulation and may result, at the discretion of the Director, in the revocation of the permit and confiscation of the species taken or possessed.

.04 Endangered Species of Wildlife, Reptiles, Amphibians, Mollusks, Crustaceans and Finfish.

A. Listing Criteria. The following factors shall be considered for listing any species other than plants as endangered:

(1) Whether the species is restricted to a minimal geographic area within Maryland;

(2) Whether the species has experienced a rapid, substantial decline in Maryland, and if the decline continues, the species' extirpation from Maryland is imminent;

(3) Whether the species' essential habitat has been rapidly lost and that loss is likely to continue;

(4) Whether the species' biology makes it highly susceptible to changes in its environment; or

(5) Whether the species' essential habitat is easily altered by even relatively minor activities.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Permits shall be issued only for scientific research designed to enhance the recovery of the species or population.

(2) A person may not take, export, possess, process, sell or offer for sale, deliver, carry, transport, or ship by any means any endangered wildlife, reptile, amphibian, mollusk, crustacean or finfish species except by special permit from the Director.

C. The following wildlife, reptile, amphibian, mollusk, crustacean and finfish species are considered endangered throughout Maryland unless a smaller range is indicated:

(1) Platyhelminthes. A Planarian (Procotyla typhlops).

(2) Mollusks. Ancient Floater (Alasmidonta heterodon).

(3) Crustaceans.

(a) Dearolf's Cave Amphipod (Crangonyx dearolfi);

(b) Greenbriar Cave Amphipod (Stygobromus emarginatus);

(c) Shenandoah Cave Amphipod (Stygobromus gracilipes).

(4) Insects.

(a) Northeastern Beach Tiger-Beetle (Cicindela dorsalis);

(b) Puritan Tiger-Beetle (Cicindela puritana);

(c) Six-Banded Longhorn-Beetle (Dryobius sexnotatus);

(d) Regal Fritillary (Speyeria idalia).

(5) Fish. Maryland Darter (Etheostoma sellare).

(6) Amphibians.

(a) Eastern Tiger Salamander (Ambystoma tigrinum);

(b) Green Salamander (Aneides aeneus);

(c) Hellbender (Cryptobranchus alleganiensis);

(d) Eastern Narrow-Mouthed Toad (Gastrophryne carolinensis).

(7) Reptiles.

(a) Atlantic Leatherback Turtle (Dermochelys coriacea);

(b) Atlantic Hawksbill Turtle (Eretmochelys imbricata);

(c) Northern Coal Skink (Eumeces anthracinus);

(d) Atlantic Ridley Turtle (Lepidochelys kempi);

(e) Mountain Earth Snake (Virginia valeriae pulchra).

(8) Birds.

(a) Piping Plover (Charadrius melodus);

(b) Peregrine Falcon (Falco peregrinus);

(c) Bald Eagle (Haliaeetus leucocephalus);

(d) Loggerhead Shrike (Lanius ludovicianus);

(e) Bewick's Wren (Thryomanes bewickii).

(9) Mammals.

(a) Black Right Whale (Balaena glacialis);

(b) Sei Whale (Balaenoptera borealis);

(c) Blue Whale (Balaenoptera musculus);

(d) Finback Whale (Balaenoptera physalus);

(e) Humpback Whale (Megaptera novaeangliae);
(f) Indiana Bat (Myotis sodalis);
(g) Sperm Whale (Physeter catodon);
(h) Delmarva Fox Squirrel (Sciurus niger cinereus);
(i) Water Shrew (Sorex palustris).

.05 Endangered Species of Plants.

A. Listing Criteria. The following factors shall be considered for listing a plant species as endangered:

(1) Whether only a few populations are known in Maryland and they cover only a small portion of land;

(2) Whether the species is restricted to a minimal geographic area;

(3) Whether the species has experienced a substantial decline in Maryland, and if the decline continues, the species' extirpation from Maryland is imminent;

(4) Whether the species' essential habitat has been rapidly lost and that loss is likely to continue;

(5) Whether the species' biology makes it highly susceptible to changes in its environment; or

(6) Whether the species' essential habitat is easily altered by even relatively minor activities.

B. Permits. The permit procedures to be followed are set forth in Regulation **.03**. The following apply:

(1) Permits shall be issued only for scientific research designed to enhance the recovery of the species or population;

(2) A person may not:

(a) Export, possess, process, sell, offer for sale, deliver, carry, transport, or ship by any means any endangered plant species without a special permit from the Director, the federal government, or another state government;

(b) Take any endangered plant species from State property except by special permit from the Director; and

(c) Take any endangered plant species from private property without the written permission of the landowner.

C. The following plant species are considered endangered throughout Maryland unless a smaller range is indicated:

(1) Sensitive Joint-Vetch (Aeschynomene virginica);
(2) Sandplain Gerardia (Agalinis acuta);
(3) (Agalinis fasciculata);
(4) Thread-Leaved Gerardia (Agalinis setacea);
(5) Woolly Three-Awn (Aristida lanosa);
(6) Virginia Heartleaf (Asarum virginicum);
(7) Red Milkweed (Asclepias rubra);
(8) Serpentine Aster (Aster depauperatus);
(9) Tickseed Sunflower (Bidens coronata);
(10) Small Beggar-Ticks (Bidens discoidea);
(11) (Bidens mitis);
(12) Aster-Like Boltonia (Boltonia asteroides);
(13) Grass-Pink (Calopogon tuberosus);
(14) Long's Bittercress (Cardamine longii);
(15) Barratt's Sedge (Carex barrattii);
(16) Buxbaum's Sedge (Carex buxbaumi);
(17) Coast Sedge (Carex exilis);
(18) Giant Sedge (Carex gigantea);
(19) (Carex joorii);
(20) Dark Green Sedge (Carex venusta);
(21) Marsh Wild Senna (Cassia fasciculata var. macrosperma);
(22) Spreading Pogonia (Cleistes divaricata);
(23) Wrinkled Jointgrass (Coelorachis rugosa);
(24) Wister's Coralroot (Corallorhiza wisteriana);
(25) Fraser's Sedge (Cymophyllus fraseri);
(26) Smooth Tick-Trefoil (Desmodium laevigatum);
(27) Linear-Leaved Tick-Trefoil (Desmodium lineatum);
(28) Cream-Flowered Tick-Trefoil (Desmodium ochroleucum);
(29) Rigid Tick-Trefoil (Desmodium rigidum);
(30) Pineland Tick-Trefoil (Desmodium strictum);
(31) Pink Sundew (Drosera capillaris);
(32) Log Fern (Dryopteris celsa);
(33) Knotted Spikerush (Eleocharis equisetoides);
(34) Black-Fruited Spikerush (Eleocharis melanocarpa);
(35) Robbins' Spikerush (Eleocharis robbinsii);
(36) Water Horsetail (Equisetum fluviatile);
(37) Bent-Awn Plumegrass (Erianthus contortus);
(38) Parker's Pipewort (Eriocaulon parkeri);
(39) White-Bracted Boneset (Eupatorium leucolepis);
(40) Darlington's Spurge (Euphorbia purpurea);
(41) Harper's Fimbristylis (Fimbristylis perpusilla);
(42) Box Huckleberry (Gaylussacia brachycera);
(43) Swamp-Pink (Helonias bullata);
(44) Featherfoil (Hottonia inflata);
(45) Creeping St. John's-Wort (Hypericum adpressum);
(46) Coppery St. John's-Wort (Hypericum denticulatum);
(47) Dwarf Iris (Iris verna);
(48) Red-Root (Lachnanthes caroliana);
(49) (Leersia hexandra);
(50) Star Duckweed (Lemna trisulca);
(51) Downy Bushclover (Lespedeza stuevei);
(52) Mudwort (Limosella subulata);
(53) Sandplain Flax (Linum intercursum);
(54) Pondspice (Litsea aestivalis);
(55) Canby's Lobelia (Lobelia canbyi);
(56) (Ludwigia glandulosa);
(57) Hairy Ludwigia (Ludwigia hirtella);
(58) Sessile-Leaved Water-Horehound (Lycopus amplectens);
(59) Erect Water-Hyssop (Mecardonia acuminata);
(60) Torrey's Dropseed (Muhlenbergia torreyana);
(61) Low Water-Milfoil (Myriophyllum humile);
(62) Floating-Heart (Nymphoides cordata);
(63) Virginia False-Gromwell (Onosmodium virginianum);
(64) Canby's Dropwort (Oxypolis canbyi);
(65) Tall Swamp Panicgrass (Panicum scabriusculum);
(66) Wright's Panicgrass (Panicum wrightianum);
(67) Kidneyleaf Grass-of-Parnassus (Parnassia asarifolia);
(68) Yellow Nailwort (Paronychia virginica);
(69) Walter's Paspalum (Paspalum dissectum);
(70) Canby's Mountain Lover (Paxistima canbyi);
(71) Blue Scorpion-Weed (Phacelia ranunculacea);
(72) Jacob's-Ladder (Polemonium van-bruntiae);
(73) Cross-Leaved Milkwort (Polygala cruciata);
(74) Dense-Flowered Knotweed (Polygonum densiflorum);
(75) Slender Rattlesnake-Root (Prenanthes autumnalis);
(76) Alleghany Plum (Prunus alleghaniensis);
(77) Short-Beaked Baldrush (Psilocarya nitens);
(78) Long-Beaked Baldrush (Psilocarya scirpoides);
(79) Harperella (Ptilimnium nodosum);
(80) One-Sided Pyrola (Pyrola secunda);
(81) Yellow Water-Crowfoot (Ranunculus flabellaris);
(82) (Rhynchosia tomentosa);
(83) Short-Bristled Hornedrush (Rhynchospora corniculata);
(84) Thread-Leaved Beakrush (Rhynchospora filifolia);
(85) Grass-Like Beakrush (Rhynchospora globularis);

(86) Clustered Beakrush (Rhynchospora glomerata);
(87) Drowned Hornedrush (Rhynchospora inundata);
(88) Torrey's Beakrush (Rhynchospora torreyana);
(89) Sacciolepis (Sacciolepis striata);
(90) Sessile-Fruited Arrowhead (Sagittaria rigida);
(91) Sandbar Willow (Salix exigua);
(92) Canby's Bulrush (Scirpus etuberculatus);
(93) Water Clubrush (Scirpus subterminalis);
(94) Slender Nutrush (Scleria minor);
(95) Pink Bog-Button (Sclerolepis uniflora);
(96) Halberd-Leaved Greenbrier (Smilax pseudo-china);
(97) Red-Berried Greenbrier (Smilax walteri);
(98) Showy Goldenrod (Solidago speciosa);
(99) Two-Flowered Bladderwort (Utricularia biflora);
(100) Fringed Yelloweyed-Grass (Xyris fimbriata);
(101) Small's Yelloweyed-Grass (Xyris smalliana).

.06 Endangered Extirpated Species.

A. Listing Criteria. The following factors shall be considered for listing a species as endangered extirpated:

(1) The species was once a viable component of the State's flora and fauna and there are no records of it naturally occurring in Maryland after 1950; or

(2) The species was once a viable component of the State's flora or fauna and recent scientific investigations have documented the loss of its habitat or disappearance of its population in Maryland.

B. Permits. Upon the discovery of a viable, naturally occurring population of any species in §§C — H, that species will be considered an endangered species and shall require the permits and conditions afforded to that status.

C. The following plant species are considered endangered extirpated throughout Maryland:

(1) Pine-Barren Gerardia (Agalinis virgata);
(2) Rough-Stemmed Wheatgrass (Agropyron trachycaulum);
(3) Golden Colicroot (Aletris aurea);
(4) Beach Pigweed (Amaranthus pumilus);
(5) Canada Anemone (Anemone canadensis);
(6) Great Angelica (Angelica atropurpurea);
(7) Filmy Angelica (Angelica triquinata);
(8) Arethusa (Arethusa bulbosa);
(9) Lake Cress (Armoracia aquatica);
(10) Bradley's Spleenwort (Asplenium bradleyi);
(11) Steele's Aster (Aster concinnus);
(12) Silvery Aster (Aster concolor);
(13) Showy Aster (Aster spectabilis);
(14) (Axonopus furcatus);
(15) Mat-Forming Water-Hyssop (Bacopa stragula);
(16) Sea Ox-Eye (Borrichia frutescens);
(17) Triangle Grape-Fern (Botrychium lanceolatum);
(18) Leathery Grape-Fern (Botrychium multifidum);
(19) Small Grape-Fern (Botrychium simplex);
(20) Blue-Hearts (Buchnera americana);
(21) Great Indian-Plantain (Cacalia muhlenbergii);
(22) (Carex careyana);
(23) Cypress-Knee Sedge (Carex decomposita);
(24) (Carex foenea);
(25) (Carex glaucescens);
(26) Lake-Bank Sedge (Carex lacustris);
(27) New England Sedge (Carex novae-angliae);
(28) Variable Sedge (Carex polymorpha);
(29) (Carex striatula);
(30) (Carex tenera);
(31) (Carex tetanica);
(32) Wood's Sedge (Carex woodii);
(33) Chaffweed (Centunculus minimus);
(34) Purple Clematis (Clematis occidentalis);
(35) Curly-Heads (Clematis ocroleuca);
(36) Rose Coreopsis (Coreopsis rosea);
(37) Pygmyweed (Crassula aquatica);
(38) Hazel Dodder (Cuscuta coryli);
(39) (Cyperus plukenetii);
(40) Showy Ladies'-Slipper (Cypripedium reginae);
(41) Few-Flowered Tick-Trefoil (Desmodium pauciflorum);
(42) (Digitaria villosa);
(43) (Eleocharis halophila);
(44) Three-Ribbed Spikerush (Eleocharis tricostata);
(45) Downy Willowherb (Epilobium strictum);
(46) Seven-Angled Pipewort (Eriocaulon septangulare);
(47) Tall Rattlesnake Master (Eryngium yuccifolium);
(48) (Festuca paradoxa);
(49) Pumpkin Ash (Fraxinus profunda);
(50) Small Bedstraw (Galium trifidum);
(51) (Gentiana puberula);
(52) Sea Milkwort (Glaux maritima);
(53) Sharp-Scaled Mannagrass (Glyceria acutiflora);
(54) Dwarf Rattlesnake-Plantain (Goodyera repens);
(55) Tesselated Rattlesnake-Plantain (Goodyera tesselata);
(56) (Gratiola ramosa);
(57) Rough Heuchera (Heuchera villosa);
(58) Sea-Beach Sandwort (Honkenya peploides);
(59) Nits-and-Lice (Hypericum drummondii);
(60) Clasping-Leaved St. John's-Wort (Hypericum gymnanthum);
(61) Great St. John's-Wort (Hypericum pyramidatum);
(62) Bloodleaf (Iresine rhizomatosa);
(63) Small Whorled Pogonia (Isotria medeoloides);
(64) Small-Headed Rush (Juncus brachycephalus);
(65) New Jersey Rush (Juncus caesariensis);
(66) (Juncus megacephalus);
(67) Bayonet Rush (Juncus militaris);
(68) Torrey's Rush (Juncus torreyi);
(69) Common Juniper (Juniperus communis);
(70) Narrow-Leaved Pinweed (Lechea tenuifolia);
(71) Catchfly-Grass (Leersia lenticularis);
(72) Long-Awned Diplanche (Leptochloa fascicularis);
(73) Fall Witchgrass (Leptoloma cognatum);
(74) Scaly Blazing-Star (Liatris squarrosa);
(75) American Lovage (Ligusticum canadense);
(76) American Frog's-Bit (Limnobium spongia);
(77) Twinflower (Linnaea borealis);
(78) Florida Yellow Flax (Linum floridanum);
(79) Heartleaf Twayblade (Listera cordata);
(80) (Lobelia glandulosa);
(81) Carolina Clubmoss (Lycopodium carolinianum);
(82) Large-Flowered Barbara's Buttons (Marshallia grandiflora);
(83) (Matelea decipiens);
(84) (Matelea obliqua);
(85) Broad-Leaved Bunchflower (Melanthium latifolium);
(86) Nuttall's Micranthemum (Micranthemum micranthemoides);
(87) Evergreen Bayberry (Myrica heterophylla);
(88) Thread-Like Naiad (Najas gracillima);
(89) Northern Panicgrass (Panicum boreale);
(90) May Grass (Pharlaris caroliniana);
(91) (Phlox carolina);

(92) (Phlox glaberrima);
(93) Mountain Phlox (Phlox latifola);
(94) Downy Phlox (Phlox pilosa);
(95) Heart-Leaved Plantain (Plantago cordata);
(96) Slender Plantain (Plantago pusilla);
(97) (Poa saltuensis);
(98) Clammyweed (Polansia dodecandra);
(99) America Ipecac (Porteranthus stipulatus);
(100) Redheadgrass (Potamogeton richardsonii);
(101) Robbins' Pondweed (Potamogeton robbinsii);
(102) Flatstem Pondweed (Potamogeton zosteriformis);
(103) Pale Mannagrass (Puccinellia pallida);
(104) Awned Mountain-Mint (Pycnanthemum setosum);
(105) Greenish-Flowered Pyrola (Pyrola virens);
(106) (Ranunculus hederaceus);
(107) Bristly Crowfoot (Ranunculus pensylvanicus);
(108) Awned Meadow-Beauty (Rhexia aristosa);
(109) Tiny-Headed Beakrush (Rhynchospora microcephala);
(110) Few-Flowered Beakrush (Rhynchospora rariflora);
(111) Wild Black Currant (Ribes americanum);
(112) Hairy Wild Petunia (Ruellia humilus);
(113) Pursh's Ruellia (Ruellia purshiana);
(114) Slender Marsh Pink (Sabatia campanulata);
(115) Lance-Leaved Sabatia (Sabatia difformis);
(116) Slender Arrowhead (Sagittaria teres);
(117) Shining Willow (Salix lucida);
(118) (Salvia urticifolia);
(119) Hard-Stem Bulrush (Scirpus acutus);
(120) Torrey's Clubrush (Scirpus torreyi);
(121) Shining Nutrush (Scleria nitida);
(122) Veined Skullcap (Scutellaria nervosa);
(123) Small Skullcap (Scutellaria parvula);
(124) Sand Blueeyed-Grass (Sisyrinchium arenicola);
(125) Mountain Goldenrod (Solidago roanensis);
(126) Rock Goldenrod (Solidago rupestris);
(127) (Sorghastrum elliottii);
(128) Indian-Pink (Spigelia marilandica);
(129) (Stachys aspera);
(130) Trailing Stitchwort (Stellaria alsine);
(131) (Tephrosia spicata);
(132) Coastal False Asphodel (Tofieldila racemosa);
(133) Auricled Gerardia (Tomanthera auriculata);
(134) Buffalo Clover (Trifolium reflexum);
(135) (Triglochin striatum);
(136) Tall Cornsalad (Valerianella umbilicata);
(137) Purple Vetch (Vicia americana);
(138) Wolffiella (Wolffiella floridana).

D. The following fish species are considered endangered extirpated throughout Maryland:
(1) Glassy Darter (Etheostoma vitreum);
(2) Stripeback Darter (Percina notogramа);
(3) Trout-Perch (Percopsis omiscomaycus).

E. The following amphibian species is considered endangered extirpated throughout Maryland: Greater Siren (Siren lacertina).

F. The following reptile species is considered endangered extirpated throughout Maryland: Rainbow Snake (Farancia erytrogramma).

G. The following bird species are considered endangered extirpated throughout Maryland:
(1) Bachman's Sparrow (Aimophila aestivalis);
(2) Ivory-Billed Woodpecker (Campephilus principalis);
(3) Lark Sparrow (Chondestes grammacus);
(4) Eskimo Curlew (Numenius borealis);
(5) Red-Cockaded Woodpecker (Picoides borealis);
(6) Roseate Tern (Sterna dougallii);
(7) Greater Prairie Chicken (Tympanuchus cupido).

H. The following mammal species are considered endangered extirpated throughout Maryland:
(1) Gray Wolf (Canis lupus);
(2) American Elk (Cervus canadensis);
(3) Eastern Mountain Lion (Felis concolor);
(4) Snowshoe Hare (Lepus americanus);
(5) Marten (Martes americana).

.07 Threatened Species of Wildlife, Reptiles, Amphibians, Mollusks, Crustaceans, and Finfish.

A. Listing Criteria. The following factors shall be considered for listing species other than plant species as threatened:

(1) Whether the species has experienced a steady, substantial decline in Maryland, and if the decline continues, the species is likely to become endangered;

(2) Whether there has been steady, widespread loss of the species' essential habitat; or

(3) Whether protection measures already taken have significantly reduced the chances of the species becoming extirpated from Maryland.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Except by special permit from the Director a person may not take, export, possess, process, sell, offer for sale, deliver, carry, transport or ship by any means any threatened wildlife, reptile, amphibian, mollusk, crustacean or finfish species.

(2) Permits to take threatened species shall be issued only for:

(a) Scientific research designed to enhance the recovery of the species or population;

(b) Other valid scientific research; or

(c) Educational purposes designed to further public awareness regarding the species.

(3) Incidental taking of a threatened wildlife, reptile, amphibian, mollusk, crustacean or finfish species shall be allowed only after the Director has been notified 30 days in advance of the change in land use or other action by a private landowner which shall result in the incidental taking. The Maryland Forest, Park and Wildlife Service, upon receipt of the application for an incidental taking permit from the landowner, shall within 30 days either:

(a) Take action to salvage the threatened species; or

(b) Issue to the landowner an incidental taking permit authorizing the landowner to proceed with the action which will result in the incidental taking of the species.

C. The following species are considered to be threatened throughout Maryland unless a smaller range is indicated:

(1) Crustaceans. Allegheny Cave Amphipod (Stygobromus allegheniensis).

(2) Insects. Rare Skipper (Problema bulenta).

(3) Reptiles.
(a) Atlantic Loggerhead Turtle (Caretta caretta);
(b) Atlantic Green Turtle (Chelonia mydas).

(4) Birds. Black Skimmer (Rynchops niger).

.08 Threatened Species of Plants.

A. Listing Criteria. The following factors shall be considered for listing a plant species as threatened:

(1) Whether the species has experienced a substantial decline in Maryland, and if the decline continues, the species is likely to become endangered;

(2) Whether there has been a steady widespread loss of the species' essential habitat; or

(3) Whether the species has been listed as endangered but it has been shown that protection measures taken have significantly reduced the chances of the species becoming extirpated from Maryland.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Permits shall be issued only for scientific research designed to enhance the recovery of the species or population.

(2) A person may not:

(a) Export, possess, process, sell, offer for sale, deliver, carry, transport, or ship by any means any threatened plant species except by a special permit from the Director;

(b) Take any threatened plant species from State property except by special permit from the Director; and

(c) Take any threatened plant species from private property without the written permission of the landowner.

C. The following plant species are considered threatened throughout Maryland unless a smaller range is indicated:

(1) Single-Headed Pussytoes (Antennaria solitaria);
(2) Giant Cane (Arundinaria gigantea);
(3) Glade Fern (Athyrium pycnocarpon);
(4) Maryland Bur-Marigold (Bidens bidentoides);
(5) Button Sedge (Carex bullata);
(6) Shoreline Sedge (Carex hyalinolepis);
(7) Inflated Sedge (Carex vesicaria);
(8) Leatherleaf (Chamaedaphne calyculata);
(9) Red Turtlehead (Chelone obliqua);
(10) Goldenseal (Hydrastis canadenis);
(11) Deciduous Holly (Ilex decidua);
(12) Narrow-Leaved Bushclover (Lespedeza angustifolia);
(13) Wild Lupine (Lupinus perennis);
(14) Climbing Fern (Lygodium palmatum);
(15) American Lotus (Nelumbo lutea);
(16) Red Bay (Persea borbonia);
(17) Pale Green Orchis (Platanthera flava);
(18) Purple Fringeless Orchis (Platanthera peramoena);
(19) Spongy Lophotocarpus (Sagittaria calycina);
(20) Engelmann's Arrowhead (Sagitttaria engelmanniana);
(21) Northern Pitcher-Plant (Sarracenia purpurea);
(22) Virginia Mallow (Sida hermaphrodita);
(23) Featherbells (Stenanthium gramineum);
(24) Mountain Pimpernel (Taenidia montana);
(25) Steele's Meadowrue (Thalictrum steeleanum);
(26) Kate's-Mountain Clover (Trifolium virginicum);
(27) Dwarf Trillium (Trillium pusillum);
(28) Purple Bladderwort (Utricularia purpurea).

.09 Species in Need of Conservation.

A. Listing Criteria. The following factors shall be considered for listing a species as in need of conservation:

(1) Whether the population is limited or declining within Maryland; and

(2) Whether the species may become threatened in the foreseeable future, if current trends or conditions persist.

B. Permits. The permit procedures to be followed are set forth in Regulation .03. The following apply:

(1) Except by special permit, a person may not take, export, possess, process, sell, offer for sale, deliver, carry, transport, or ship by any means any species in need of conservation.

(2) Permits to take species in need of conservation shall be issued only for:

(a) Scientific research designed to enhance the recovery of the species or population;

(b) Other valid scientific research; or

(c) Educational purposes designed to further public awareness regarding the species.

(3) Incidental taking permits are not required for species in need of conservation.

C. The following species are considered to be in need of conservation throughout Maryland unless a smaller range is indicated:

(1) Insects. King's Hairstreak (Satyrium kingi).
(2) Fish. Blackbanded Sunfish (Enneacanthus chaetodon).
(3) Amphibians. Carpenter Frog (Rana virgatipes).
(4) Reptiles. Map Turtle (Graptemys geographica).
(5) Birds.
(a) Henslow's Sparrow (Ammodramus henslowii);
(b) Short-Eared Owl (Asio flammeus);
(c) American Bittern (Botaurus lentiginosus);
(d) Sedge Wren (Cistothorus platensis);
(e) Little Blue Heron (Egretta caerulea);
(f) Common Moorhen (Gallinula chloropus);
(g) American Oystercatcher (Haematopus palliatus);
(h) Least Bittern (Ixobrychus exilis);
(i) Black Rail (Laterallus jamaicensis);
(j) Swainson's Warbler (Limnothlypis swainsonii);
(k) Least Tern (Sterna antillarum).
(6) Mammals.
(a) Porcupine (Erethizon dorsatum);
(b) Bobcat (Lynx rufus);
(c) Least Weasel (Mustela nivalis);
(d) Small-Footed Bat (Myotis leibii);
(e) Southeastern Shrew (Sorex longirostris).

.10 Natural Heritage Areas.

A. Listing Criteria. In order to qualify as a natural heritage area a natural community shall:

(1) Contain one or more threatened or endangered species or wildlife species in need of conservation;

(2) Be a unique blend of geological, hydrological, climatalogical or biological features; and

(3) Be considered to be among the best Statewide examples of its kind.

B. The Forest, Park and Wildlife Service shall prepare maps describing the location of all natural heritage areas. The maps shall be filed in the office of the Director of the Forest, Park and Wildlife Service, Department of Natural Resources, Tawes State Office Building, Annapolis, MD 21401.

C. The following areas are designated natural heritage areas:

(1) Kasecamp Shale Barrens ..... Allegany County;
(2) Maple Run ..... Allegany County;
(3) Outdoor Club Shale Barrens ..... Allegany County;
(4) Sideling Hill Creek .. Allegany, Washington County;
(5) Cypress Creek Swamp ..... Anne Arundel County;
(6) Eagle Hill Bog ..... Anne Arundel County;
(7) Upper Patuxent Marshes .. Anne Arundel, Prince George's County;
(8) Black Marsh ..... Baltimore County;
(9) Robert E. Lee Park ..... Baltimore County;
(10) Camp Roosevelt Cliffs ..... Calvert County;
(11) Cove Point Marsh ..... Calvert County;
(12) Flag Ponds ..... Calvert County;
(13) Randle Cliff Beach ..... Calvert County;

(14) Grove Neck ..... Cecil County;
(15) Plum Creek ..... Cecil County;
(16) Allen's Fresh ..... Charles County;
(17) Chicamuxen Creek ..... Charles County;
(18) Popes Creek ..... Charles County;
(19) Upper Nanjemoy Creek ..... Charles County;
(20) Chicone Creek ..... Dorchester County;
(21) Mill Creek ..... Dorchester County;
(22) Savanna Lake ..... Dorchester County;
(23) Upper Blackwater River ..... Dorchester County;
(24) Upper Nanticoke River, Marshes and Swamps ..... Dorchester, Wicomico County;
(25) High Rock ..... Garrett County;
(26) Toliver Run ..... Garrett County;
(27) Great Falls ..... Montgomery County;
(28) Irish Grove ..... Somerset County;
(29) Hickory Point Cypress Swamp ... Worcester County;
(30) Lower Nassawango Creek ..... Worcester County;
(31) Mattaponi ..... Worcester County;
(32) North Sinepuxent Bay Dunes .... Worcester County.

.11 Violation of Regulations.

Violation of these regulations is a misdemeanor punishable under Natural Resources Articles, §§10-2A-07, 10-1101 et seq., 4-2A-07, and 4-1201 et seq., Annotated Code of Maryland.

TORREY C. BROWN, M.D.
Secretary of Natural Resources

Subtitle 05 WATER RESOURCES ADMINISTRATION

08.05.03 Construction on Non-Tidal Waters and Floodplains

Authority: Natural Resources Article §§8-801 thru 8-814, Annotated Code of Maryland

Notice of Proposed Action

[87-060-P]

The Secretary of Natural Resources proposes to amend Regulation .03 under **COMAR 08.05.03 Construction on Non-Tidal Waters and Floodplains.** The purpose of this amendment is to delete certain exemptions for projects in environmentally sensitive areas of the State's waterways.

Estimate of Economic Impact

I. Summary of Economic Impact. Natural Resources Article, §8-803, Annotated Code of Maryland, requires that any person wishing to change in any manner the course, current, or cross-section of any stream or body of water, first obtain a permit from the Department. Permits are obtained following the submittal of an application and accompanying documentation prescribed in **COMAR.** Regulations governing these activities have existed since the 1930's and have been amended from time-to-time in order to keep pace with goals and objectives of the Department of Natural Resources. The regulatory changes proposed at this time are necessary in order to incorporate those items the General Assembly recognized as necessary in order to preserve and enhance the quality of the State's water resources as they relate to the Chesapeake Bay.

II. Types of Economic Impacts.	Revenue (+) Expense (−)	Magnitude
A. On issuing agency: The Department expects an increase in workload as a result of the deletion of certain exemptions.	(−)	$141,000
B. On other State or local agencies affected: Additional cost to prepare submittals to the Department for review and approval.	(−)	Indeterminable. Depends on amount of applications received from other agencies.
C. On regulated industries or trade groups: 1. Additional cost to prepare engineered submittals to the Department for review and approval.	(−)	$500,000
2. Cost to persons obtaining a permit due to processing time.	(−)	$87,250
3. Time delay for those projects that require an administrative opportunity for a public hearing.	(−)	$105,000
D. On other industries or trade groups affected: Certain delays in starting the intended works may be incurred to the permit applicant as a result of the regulatory process. These delays could be borne by trade groups or subcontractors as a result of scheduling problems.	(−)	Determined on a case-by-case basis but could result in lost earnings to trade groups.
E. Direct and indirect effects on public:	(+)	Could be very large.

III. Assumptions. (Identified by Impact Letter and Number from Section II):

A. A 20 percent increase in applications received is anticipated which would bring the total number of files reviewed by WRA to 1,200 yearly. Each engineer reviews an average of 174 files per year and an inspector inspects an average of 72 waterway permit projects yearly. Based upon the current staff available, it is projected that 1 engineering and 2 inspector positions will be required.

B. An estimated expense to other State and local agencies would be based upon the time and material required to prepare permit applications.

C.1. Given an estimated increase in permit applications of 200 per year, an estimated project cost of $25,000, and an average application preparation fee of 10 percent of the project cost.

C.2. This cost is based on a minimum time to obtain a permit of one month and interest of 12 percent per annum on an average project cost of $25,000.

C.3. This cost is based on a minimum time delay of 2 additional months in permit processing time due to an expected 50 percent increase in the number of applications received. Also included is an average hearing notice publication cost of $100 per permit.

D. Depending on the amount of detailed submittals required for a particular project, time delays will result to the construction industry. In addition, improper implementation of the construction drawings, which cannot be anticipated, can result in time delays to the contractor.